# ENGINEERING NEWS-RECORD

## Pier Luigi Nervi, the 'Wizard of Cement' p.58

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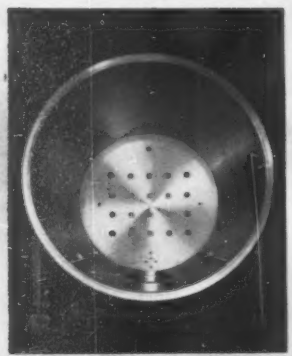

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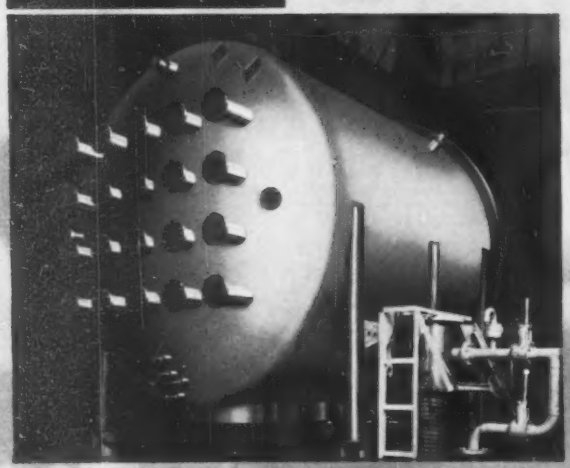

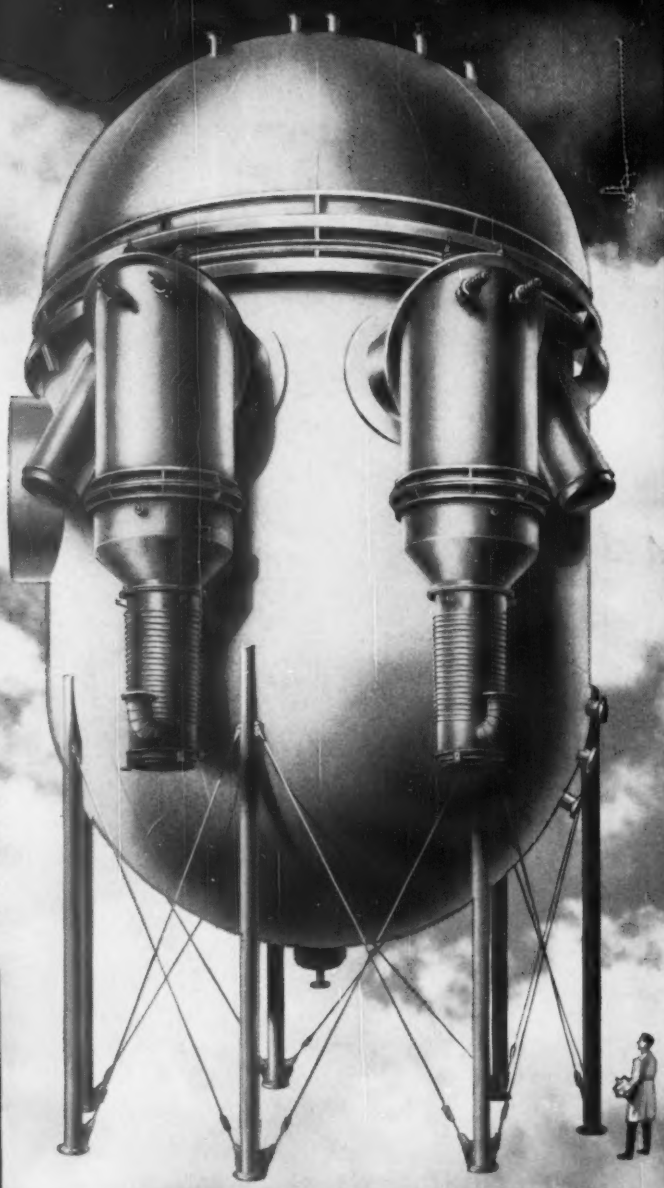

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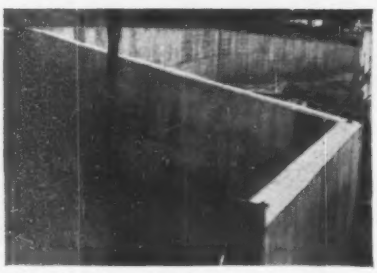

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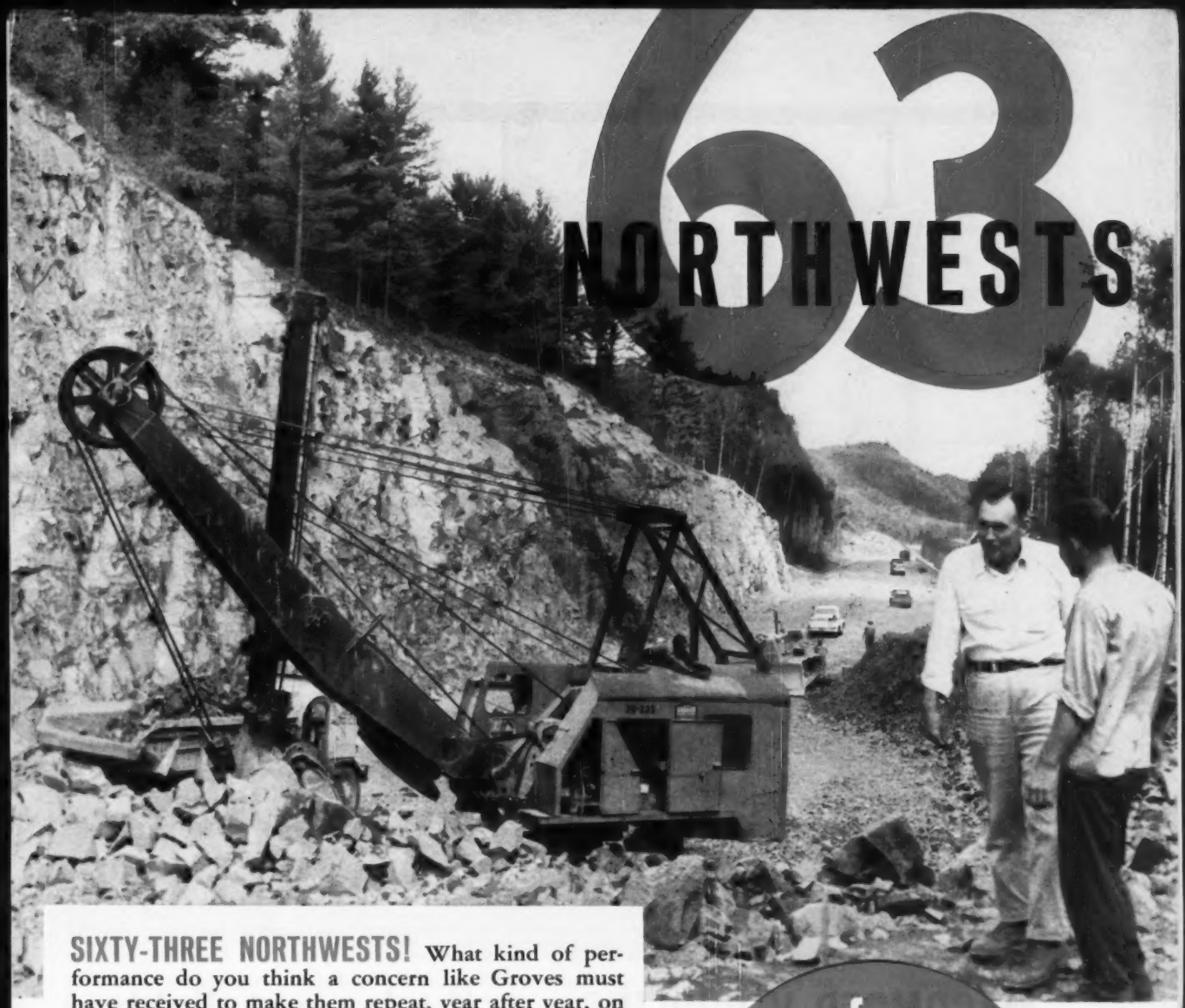


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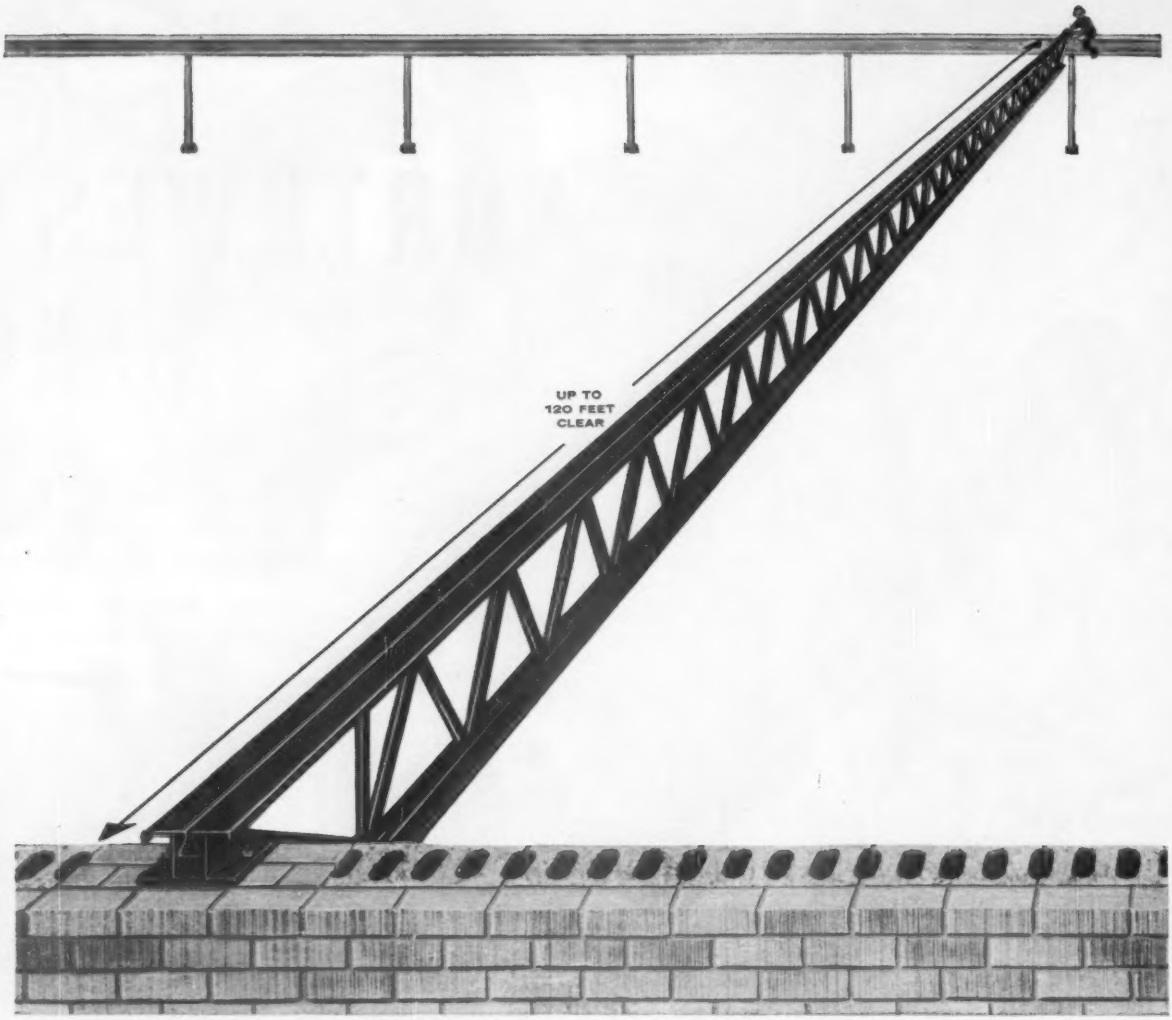


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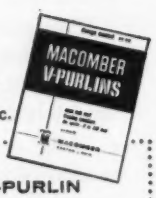


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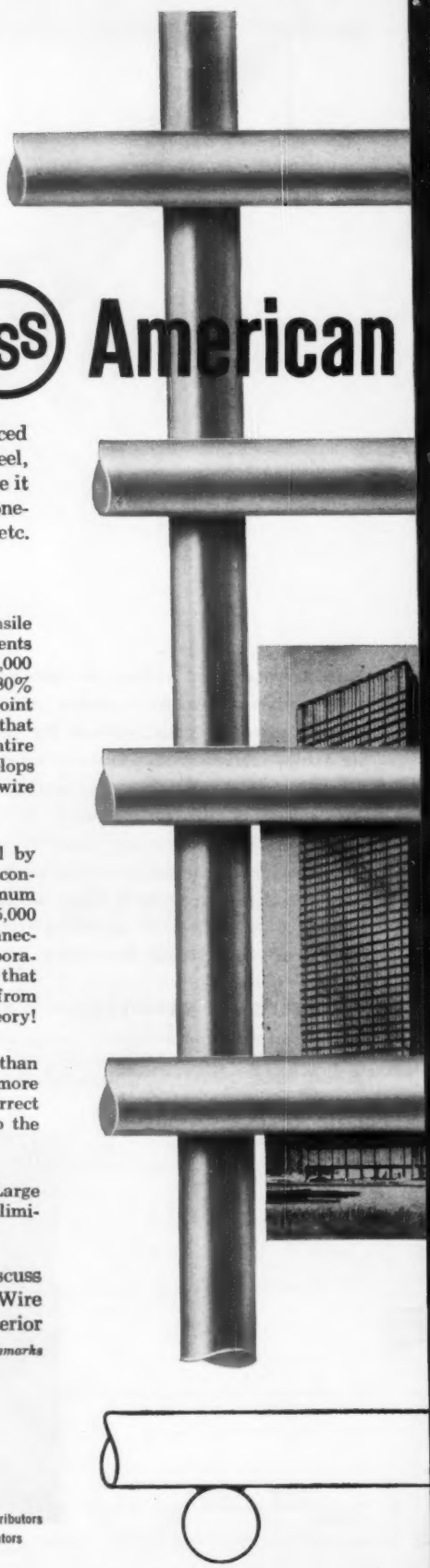

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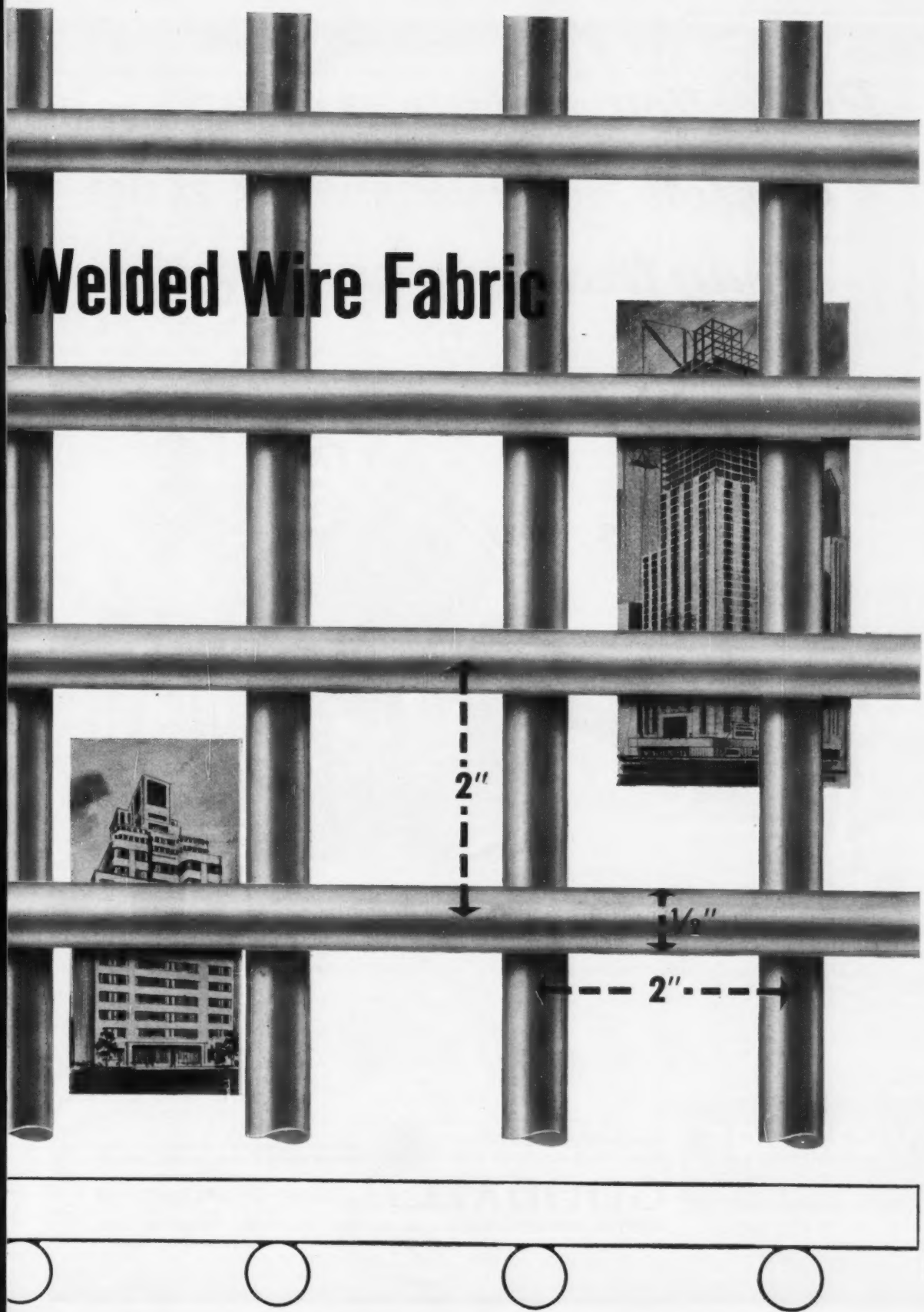

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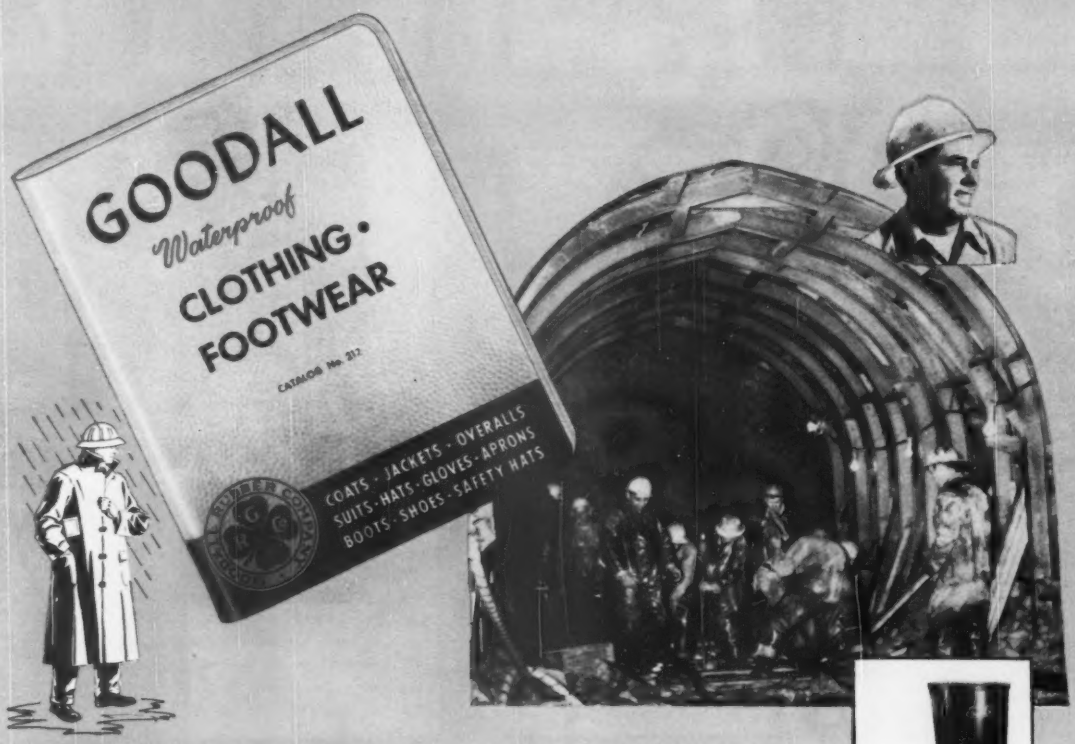


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# Controversy on the Codes

SIR—It is encouraging to note that you did not allow Mr. MacDonald's letter (ENR Mar. 30, p. 4) to go unchallenged. The Editor's Note was correct in stating that the concrete building in Harrisonburg, Va., came under the jurisdiction of no building code. This is not to say that the building was not designed properly under existing codes and specifications for concrete and prestressed concrete. Mr. MacDonald's analysis of the design in a few sentences would seem highly skeptical in view of the fact that there is conclusive evidence to indicate the bearing stresses were satisfactory. Mr. MacDonald has made several convenient omissions in his discussion of bearing stresses. Had Mr. MacDonald been properly informed, he would have known that the 1½-in. bearing was only a temporary condition and as such required adequate bracing and supports during erection, pursuant to Section 1307 (b) of the ACI Code. Even so, the temporary bearing stresses were more than adequate.

The accusation that the "design was still underdesigned by 177%," is rather serious since Mr. MacDonald did not have access to the design calculations or to the results of many tests.

For the information and edification of those who are sincerely interested in the stress condition at the column head, the following is submitted:

1. By comparing the stresses at the column head anchorage to those six existing in a post-tensioned end block pursuant to ACI-ASCE Comm. 323 Recommendations, Section 207.3.4 (and utilizing transformed area of the anchor bars), the actual bearing stress is 2,780 psi. This is less than the 3,000 psi allowed under this code. The ACI allowable bearing of 1,250 psi is on unreinforced poured concrete, and thus is not applicable to this design condition.

2. The column head had a horizontal component (caused by the negative moment of one welded top bar during erection) thus relieving the pure vertical shear on the edge of the column.

3. A full size test of the same column-to-beam connection showed no failure of the bearing in either the column or beam at ultimate capacity of the beam. This stress exceeded 10,000 psi based on 1½ in. bearing!

This writer finds it almost unbelievable that any reliable engineer would cast such disparaging suspicions on the prevailing PCI Code and the ACI-ASCE Joint Committee 323 Recommendations.

I would suggest that engineers attempt to further the profession by discussing the issues rather than by criticizing for personal recognition.

JACK D. MCGEE
*Blanton & Levy*
*Richmond, Va.*

**Editor's Note:** Blanton and Levy were structural engineers on the prestressed concrete building that collapsed during construction near Harrisonburg, Va. (ENR Dec. 1, 1960, p. 30 and Dec. 15, 1960, p. 28).

SIR—Commenting on Mr. MacDonald's letter (ENR Mar. 30, p. 4), I cannot agree that a "two-fold standard" exists which works to the competitive detriment of structural steel. Let us grant for the sake of argument that prestressed concrete design criteria are in a relatively early stage of development. How then explain the large number of failures in steel and concrete structures, presumably designed in accordance with the universally recognized AISC and ACI codes of standard practice? Mr. MacDonald will surely agree with me that these failures, where traceable to inadequate designs, have resulted not from the absence of a recognized code, but rather because of poor engineering judgment or, worse still, pathetic abdication of professional ethics to the pressure of the almighty dollar. It is a sad commentary on the engineering judgment behind these substandard designs when we consider the microscopic savings involved: an extra inch of bearing material, an extra brace, a few additional bolts or inches of weld, etc.

In the final analysis, codes can only serve as parameters of engineering performance. Codes can never cover every possible situation, nor can they be worded in such a way as to prevent misapplication or misinterpretation due to poor judgment, lack of experience, or willful attempts to circumvent their intent. No building code, be it of a jurisdictional nature or a code of standard good practice, can ever replace professional integrity.

WILLIAM C. VALLES
*New York, N. Y.*

SIR—Mr. MacDonald feels that ". . . in building design today . . ." prestressed concrete structures are permitted ". . . to be built without adherence to any comparable specification criteria."

Since Mr. MacDonald is representing Vierling Steel Works in Chicago,

(Please turn the page)

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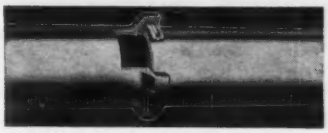

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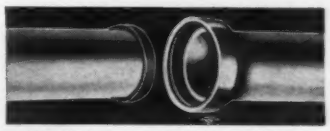

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## . . . Reader Comment

Ill., he can be excused for not being acquainted with the adequately established design criteria for prestressed concrete structures.

Failures occur with all types of structures, including structural steel. It is frivolity to condemn the entire profession or the material because of such failures.

ERNEST KALVE
*Chicago, Ill.*

SIR—The Editor's Note following Mr. Lewis MacDonald's letter (ENR Mar. 30, p. 4) was rather distressing for several reasons.

To imply that an architect or engineer is not bound by any specification if he designs in an area not having a building code is improper. A registered engineer or architect is bound by: 1) the registration laws which require that he safeguard the life, health and property of the public; and 2) the code of ethics of his profession which requires that he put the public welfare above all other considerations. The architect and engineer, therefore, are bound, whether by specification or not, to design a facility which is safe, sound and proper for its intended use.

We therefore heartily concur in Mr. MacDonald's criticism and should like to stress again, the existence of a building code does not bear on this case in any way.

J. F. KOENEN
*Arlington Heights, Ill.*

SIR—In reply to Mr. Lewis MacDonald's statement on the Harrisonburg collapse, ENR implied that the lack of jurisdiction by local or state codes precludes the use of the ACI Code and AISCE Specifications as minimum requirements.

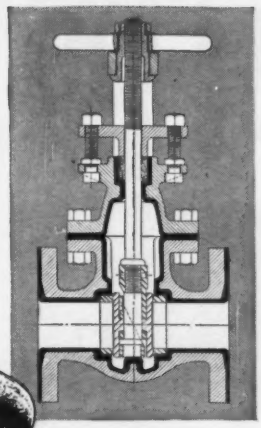
Good engineering is certainly based on the two codes and cannot be waived in the absence of legal pressure.

H. TANANA
*Detroit, Mich.*

SIR—Don't you feel that the last sentence of your Editor's Note to Lewis MacDonald's letter, Chicago, Ill., should be clarified, amplified, or explained? Don't you feel that while the bald sentence itself is no doubt true, every engineer is morally and ethically responsible for the feasibility, safety, and adequacy of any engineering structure? Or is this another "you understand what I mean" sentence? I agree with Mr. MacDonald on the matter.

W. J. YOUNGERMAN
*City Engineer*
*Fairmont, Minn.*

**Editor's Note**—The Editor's Note correctly stated that "the designer was not bound by the provisions of any specification," since the building site was outside the jurisdiction of any building code. Perhaps we should have said, "legally bound." In any event, the statement does not remotely imply that design by ACI Code or AISC Specifications was precluded.



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# Darling

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Darling rubber-lined iron body gate valves in rising stem, cylinder or motor operated, and quick-opening types, as well as rubber-lined iron body check valves, are available in sizes from 2″ to 24″. Write, wire or phone for bulletins.

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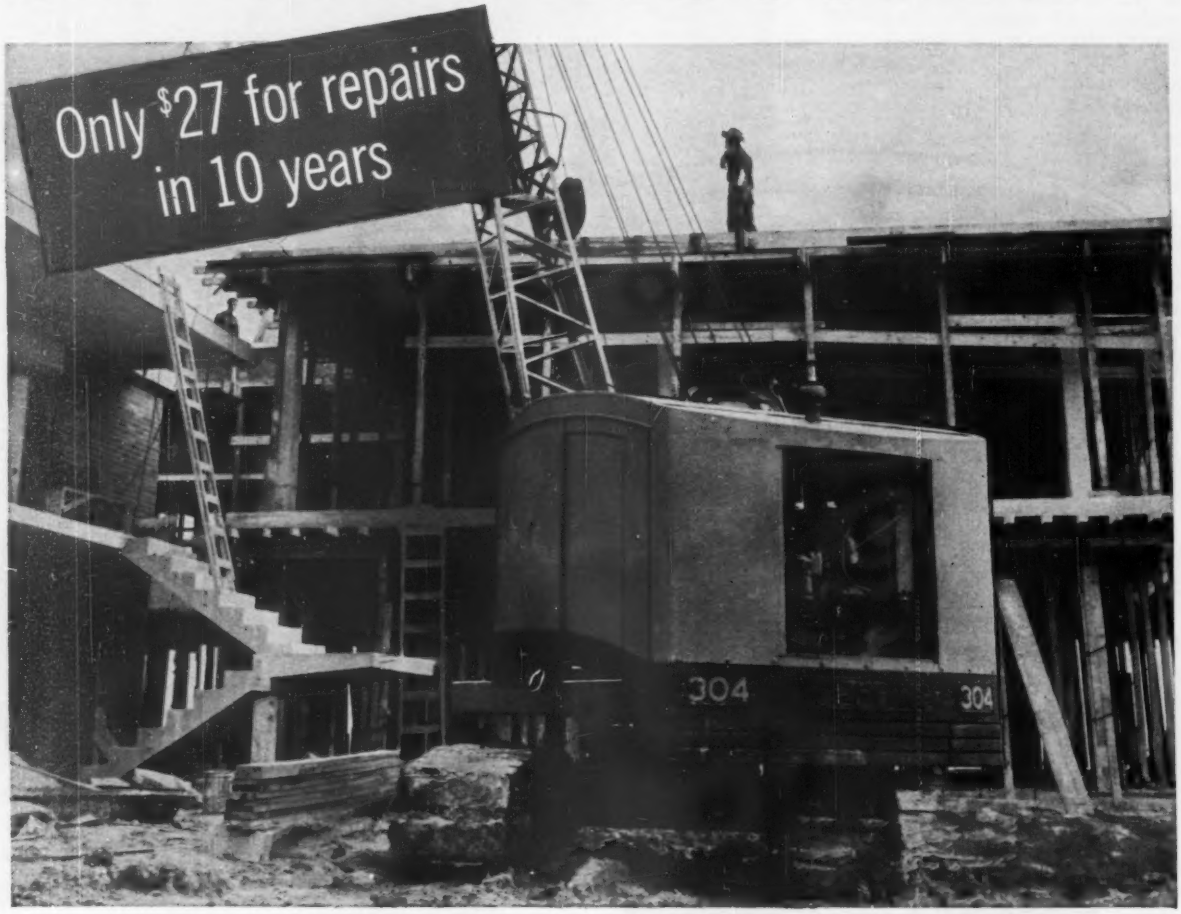


When you get 10 years' service from a Diesel, and spend only $27.00 for repairs, you're dollars and dollars ahead of the game.

And that has been the exact experience of Corpus Christi's A. E. Hinman Construction Company.

They put a 3-71 GM Diesel in a Koehring 304 ten years ago . . . added up their engine repair bills recently and discovered the only expense they'd had in all that time was $27 for injector repairs.

And in those ten years, the "Jimmy" Diesel has averaged about 2,000 hours per year—worked on all kinds of general construction jobs throughout South Texas.

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You'll get more productivity—and profits—*from* your equipment with GM Diesels *in* your equipment. Wide parts interchangeability, for instance, will save you big money. Proof? Call your GM Diesel distributor—he's in the Yellow Pages under "Engines, Diesel"—or write us direct.

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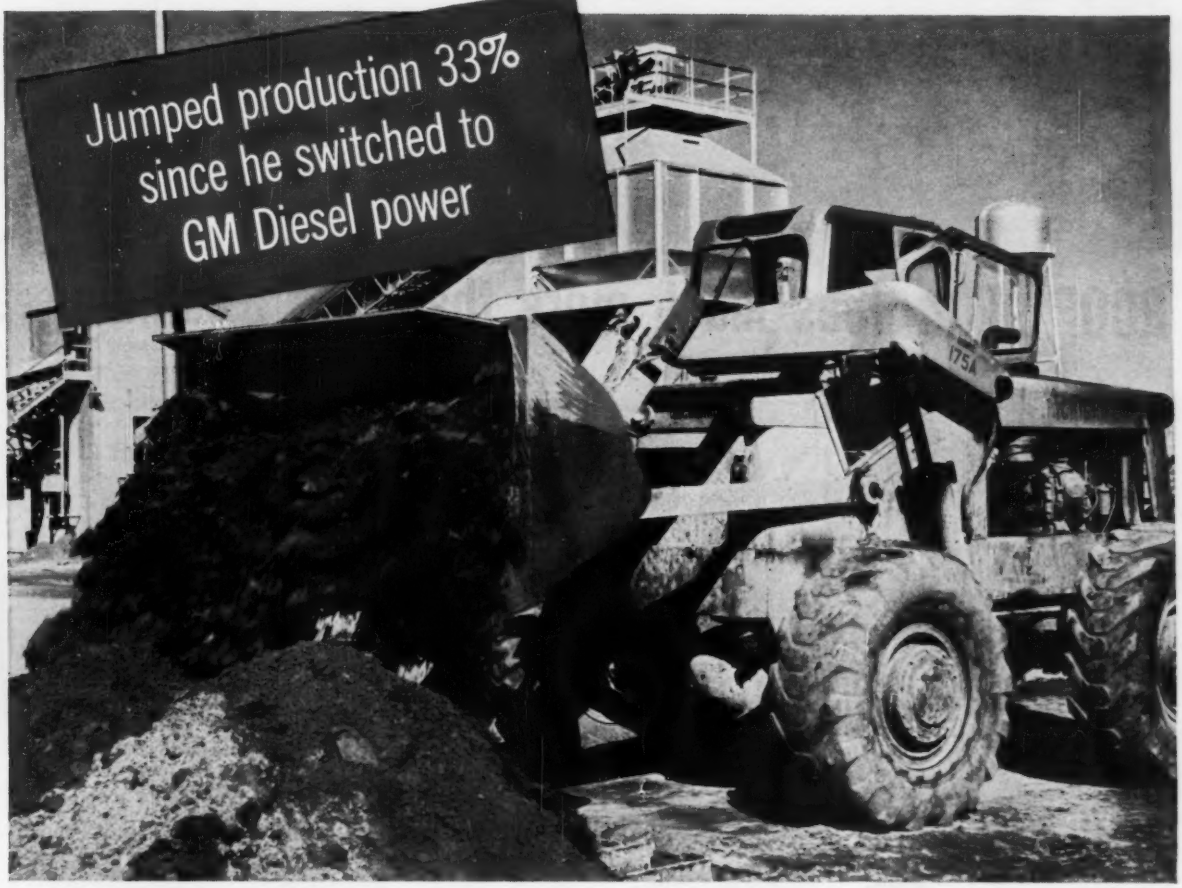


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**Sets the standard of Diesel productivity**

GRANCO

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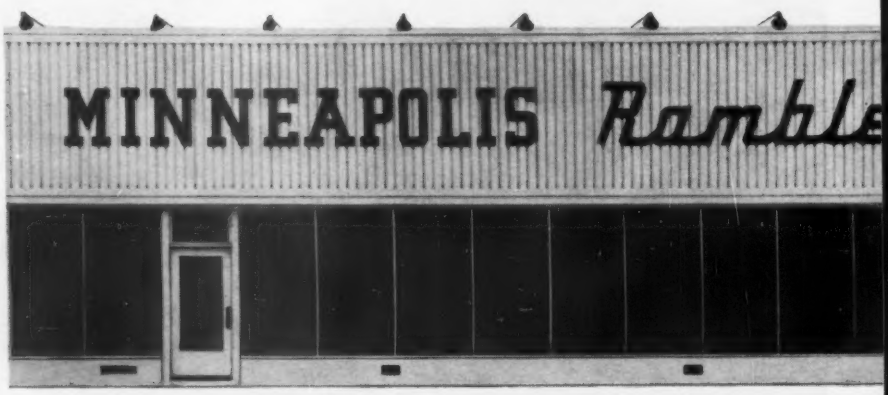
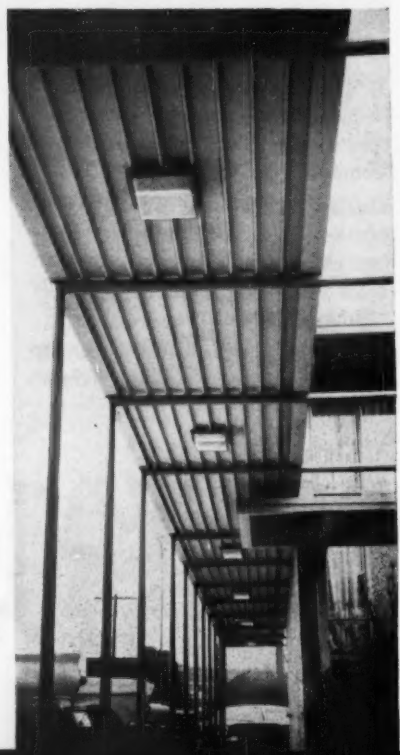


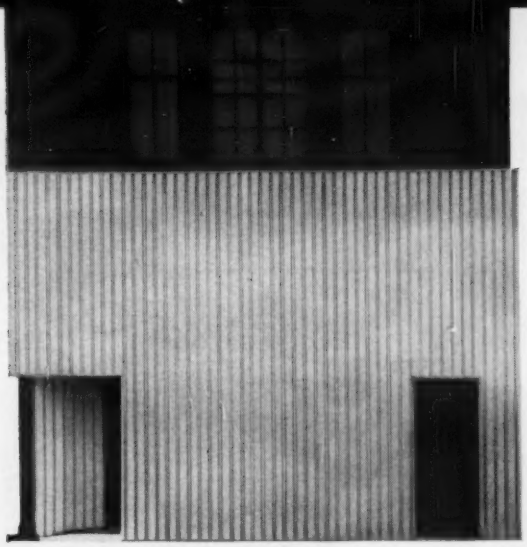

it's a crisp fascia or background for signs . . .

works well with a variety of building materials . . .

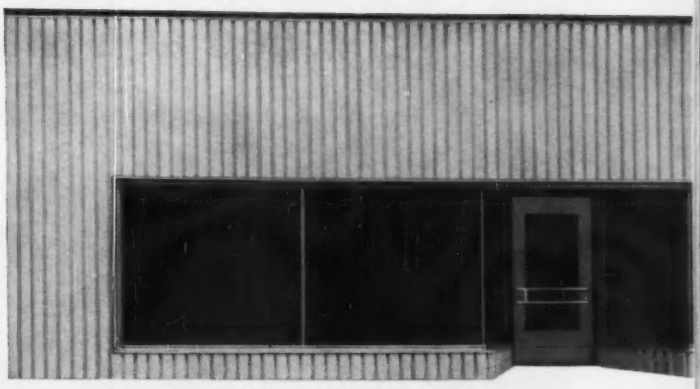
curve it or turn 90° corners . . .



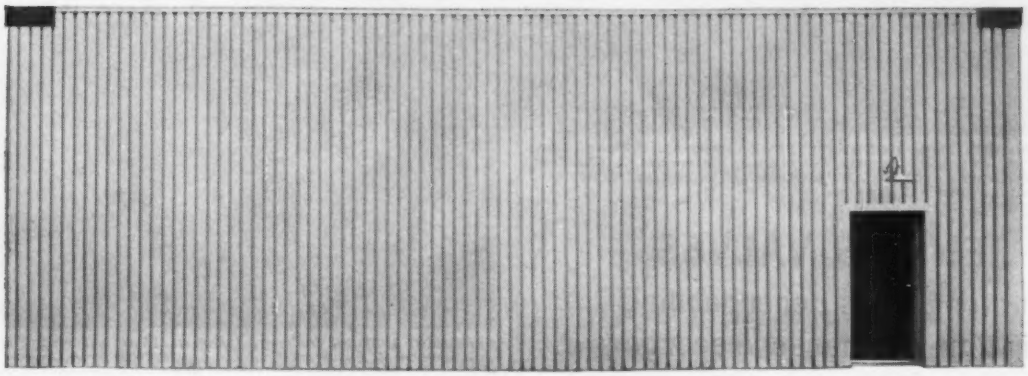
produces a clean, absolutely uniform texture for many design applications . . .



**it refaces old buildings . . .**



**or finishes new store fronts . . .**



**or siding for a complete building . . .**

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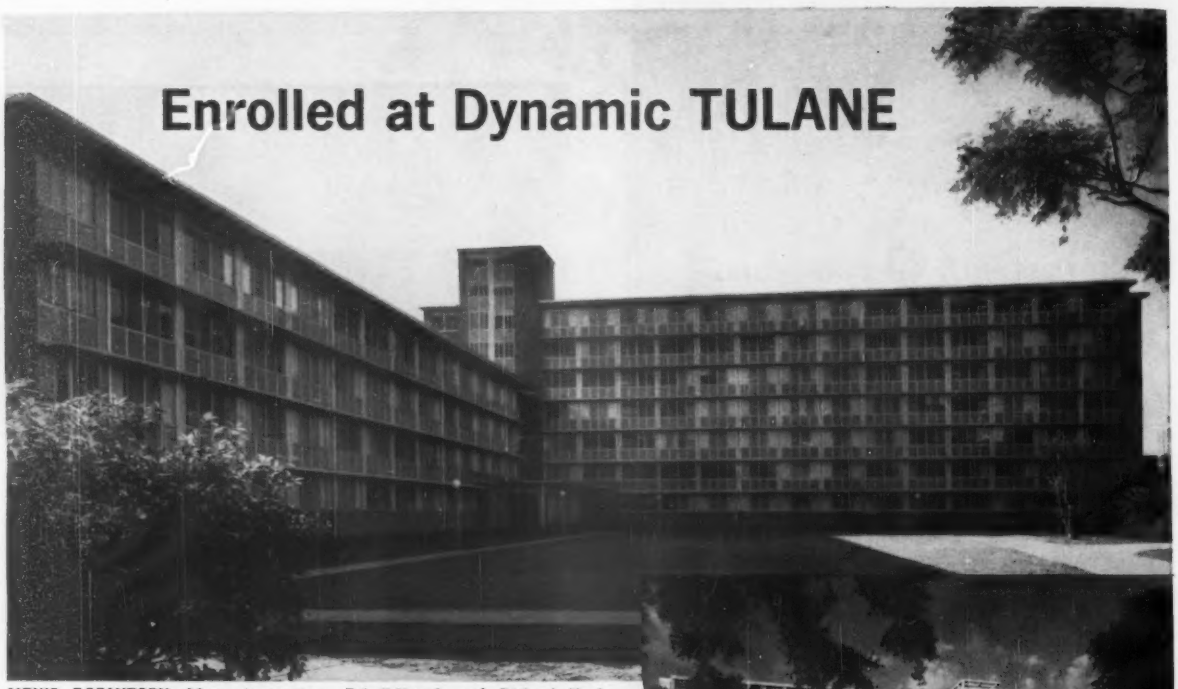


**MEN'S DORMITORY.** MAIN ARCHITECTS: *Diboll-Kessels and Richard Koch; S. Wilson, Jr. & Associates.* GENERAL CONTRACTOR: *Farnsworth & Chambers.* MECHANICAL CONTRACTOR: *Cabirac Mechanical Contractors, Inc.* CONSULTING ENGINEERS: *Jos. E. Leininger & Associates.*

## JENKINS VALVES

### for long-range dependability, long-time maintenance economy

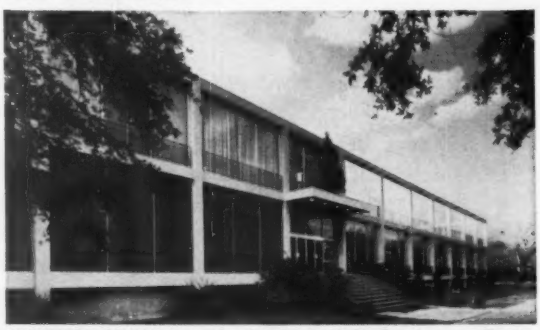
"Dynamic" is the word for tradition-laden, prestige-rich, 127-year-old Tulane University in New Orleans.

Nowhere is Tulane's dynamism more remarkable and articulate than in its current building program.* Examples: the three brand new, beautiful and beautifully functional structures pictured here.

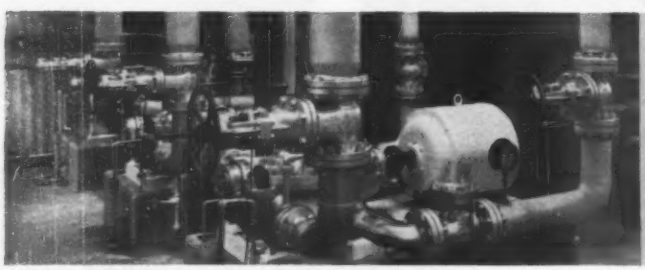
If you toured these buildings and the power plant which serves the campus complex, again and again and again you'd see the distinctive Diamond-mark that identifies Jenkins Valves. And small wonder: a university which had its beginnings more than a century ago just naturally thinks in terms of long-range dependability, long-time maintenance economy . . . precisely the qualities which make Jenkins Valves the "Standard of Quality" by which other valves are measured! Yet — and this fact still comes as a pleasant surprise to some specifiers — *they cost no more!* Jenkins Bros., 100 Park Ave., New York 17.

*Tulane's supervisory and liaison personnel for the building program: Harold E. Pique, Director of Planning; George F. Johnson, Director of Physical Plant; Charles E. Gilbert, Utilities Superintendent.

**APARTMENT BUILDING** *for married students.* MAIN ARCHITECTS: *Goldstein, Parham & Labouisse.* GENERAL CONTRACTOR: *J. A. Jones Construction Co.* MECHANICAL CONTRACTOR: *Sciambra & Masino.* PLUMBING CONTRACTOR: *Jas. F. O'Neil Co., Inc.* CONSULTING ENGINEERS: *Design Engineers & Associates.*



**UNIVERSITY CENTER** *features swimming pool, bowling lanes, radio station, cafeteria, ballroom.* MAIN ARCHITECTS: *Curtis & Davis and Associates; Edward Silverstein.* GENERAL CONTRACTOR: *Farnsworth & Chambers.* MECHANICAL CONTRACTOR: *Sciambra & Masino.* CONSULTING ENGINEERS: *Leo S. Weil; Walter B. Moses.*



**POWER PLANT.** *Boiler feed water pumps and Jenkins Valves shown.* MAIN ARCHITECTS: *Paul Charbonnet, Jr.* GENERAL CONTRACTOR: *Gervais Favrot Co.* MECHANICAL & PLUMBING CONTRACTOR: *Comfortaire Co., Inc.* CONSULTING ENGINEERS: *Leo S. Weil; Walter B. Moses.*

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# ENGINEERING NEWS-RECORD

Vol. 166, No. 17 April 27, 1961

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*Back issues of* ENGINEERING NEWS-RECORD *are generally available for the previous six months. Semiannual indexes will be sent on request.* ENGINEERING NEWS-RECORD *is also indexed in the Applied Science & Technology Index, Business Periodicals Index and the Engineering Index.*


# THE CONSTRUCTION WEEK

**ROAD FINANCING SHAPES UP**—The House Ways and Means Committee this week approved tax legislation that would permit completion of the Interstate system by 1972, on schedule. The formula: keep present fuel taxes at four cents a gallon; increase tax on heavy trucks from $1.50 to $3.00 a year; increase taxes on tires, inner tubes and tread rubber slightly; and put the entire 10% excise tax on trucks into the Highway Trust Fund (half of it now goes to the general treasury).

**OUT OF THE RED**—Merritt-Chapman & Scott Corp.'s construction department operated at a profit in the first quarter, according to Marshal G. Staub, president. The diversified company lost $29.7 million last year—a hefty portion chargeable to construction.

**NO MONEY DOWN**—Massachusetts Gov. John Volpe expects a decision next week on his request for release of some or all of $12 million in federal highway aid that has been held up since January, 1960. The Bureau of Public Roads halted reimbursement for right-of-way purchases when a House public works subcommittee alleged that state appraisers were overvaluing land. Since then the subcommittee, BPR, the FBI and the Internal Revenue Service have been investigating the charges.

**OFF THE DRAWING BOARD**—Construction will start this summer on $70 million worth of buildings at Los Angeles' Century City commercial and residential complex. Ultimate development costs over 10 years are placed at $500 million by joint venturers Webb & Knapp, Inc. and Aluminum Co. of America.

**CHESAPEAKE BAY JOB SLOWED**—A walkout of operating engineers has slowed work on the 17.5-mile Chesapeake Bay bridge and tunnel project. The men quit last week after a 15-hour meeting with contractors failed to get agreement on a new contract.

**OROVILLE BID CALL?**—Contrary to recommendations of consultants, the California Department of Water Resources is forging ahead on Oroville Dam. Bids are expected to be taken in August for the first of two diversion tunnels. Over the next 10 years about $376 million will be poured into the huge multipurpose dam on the Feather River. Chas. T. Main, Inc., Boston consultants, had recommended postponement until 1974 (ENR Nov. 3, 1960, p. 23).

**BACK TO EARTH**—An eight-story building under construction in Moscow for the Soviet newspaper PRAVDA collapsed last week. It reportedly toppled when a crane swung a large precast concrete wall panel into the steel frame. Details are scarce because PRAVDA, which means truth, hasn't mentioned the failure.

# operation double duty

***GRIFFIN*** **Solves Another Dewatering Problem!** Two areas, 500' apart, at the Trenton Sewage Treatment Plant, Trenton, N. J., were dewatered in record time using a GRIFFIN Wellpoint System with a **single** pump station.

One ring of Wellpoints encircled excavations for four 75' diameter digestors. Another ring encircled two 125' diameter clarifiers. The two rings were connected to the single pump station by a common suction line. The strategic location of this double duty set-up dewatered the entire plant site with a minimum of equipment and effort.

Further proof of time and money saving advantages of GRIFFIN Wellpoint engineering, supervision and equipment.

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# WASHINGTON OBSERVER

- **Major public works aid unlikely**
- **But aid to airports is probable**
- **Congress to probe Texas tower failure**

- **A proposal for a billion-dollar federal public works program is not given much of a chance in Congress.** Congressmen Henry S. Reuss (D., Wis.) and John A. Blatnik (D., Minn.) introduced a bill under which the federal government would put up $1 for every $2 raised by communities for local public works projects.

  **Administration support for such a program is lacking.** And it is not likely to be forthcoming unless business takes an unexpected downturn. In such a case, the Administration would support the plan, or one like it, to provide jobs in a hurry.

—

- **The new airport aid bill offered this week by Sen. Mike Monroney (D., Okla.) is given an excellent chance.** At the request of the Administration, Senator Monroney changed his proposal from $100 million a year for four years to $75 million annually for five years. Present spending, which expires June 30, is at $63 million a year. Senator Monroney won Administration agreement that if hearings on the bill show a greater need, the White House will support a larger figure.

—

- **Congress will haul the Air Force and Navy up for a review of January's Texas tower disaster.** The Senate preparedness subcommittee, headed by Sen. John Stennis (D., Miss.), plans to start hearings in about a week. It will try to determine if the tower was faulty in design or in construction.

—

- **President Kennedy isn't buying the idea of a Cabinet-level Department of Transportation**—or even a super regulatory agency in the transportation field. He will concentrate instead on improving and speeding operations of existing separate agencies that regulate land, sea and air transport and on strengthening the office of Undersecretary of Commerce for Transportation.

  **Creation of the new department was proposed by a special task force that studied the problem for the Senate Commerce Committee.** But even Sen. Warren G. Magnuson (D., Wash.), committee chairman, opposes the idea. His opposition, plus that of the Administration, means that the proposal never will get off the ground.

—

- **The Air Force is considering a proposal to scrap plans for a Titan II installation already under construction.** The idea would be to replace the underground liquid-fueled missile sites with additional silo launchers elsewhere for the solid-propellant Minuteman missile.

  The Administration already has killed plans for a two-squadron Titan II base at Rome, N. Y. But a construction contract for this had not yet been let. The cancellation now being considered would involve work already under way—presumably at Little Rock, Ark. The high cost of canceling this project may mitigate against the proposal.

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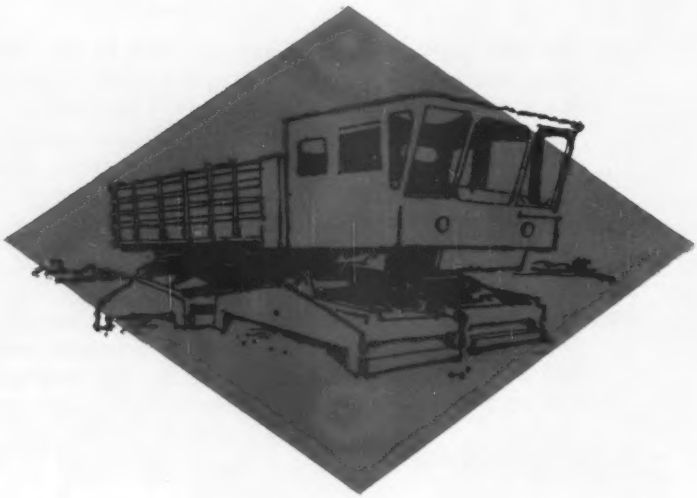
. . . for the manufacturer who stores finished equipment in an open area for an indefinite period before selling.

**1.** Tousey Duracote eliminates costly retreating, even after several months of open air storage.



**2.** Tousey S/Q Duracote has greater film flexibility retention. (Tests show up to 100% increased retention over many first line quality finishes.)

**3.** Tousey S/Q Duracote can be duplicated in both color and method of application to your present finish.

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A request written on your stationery will bring complete information about this remarkable new finish.

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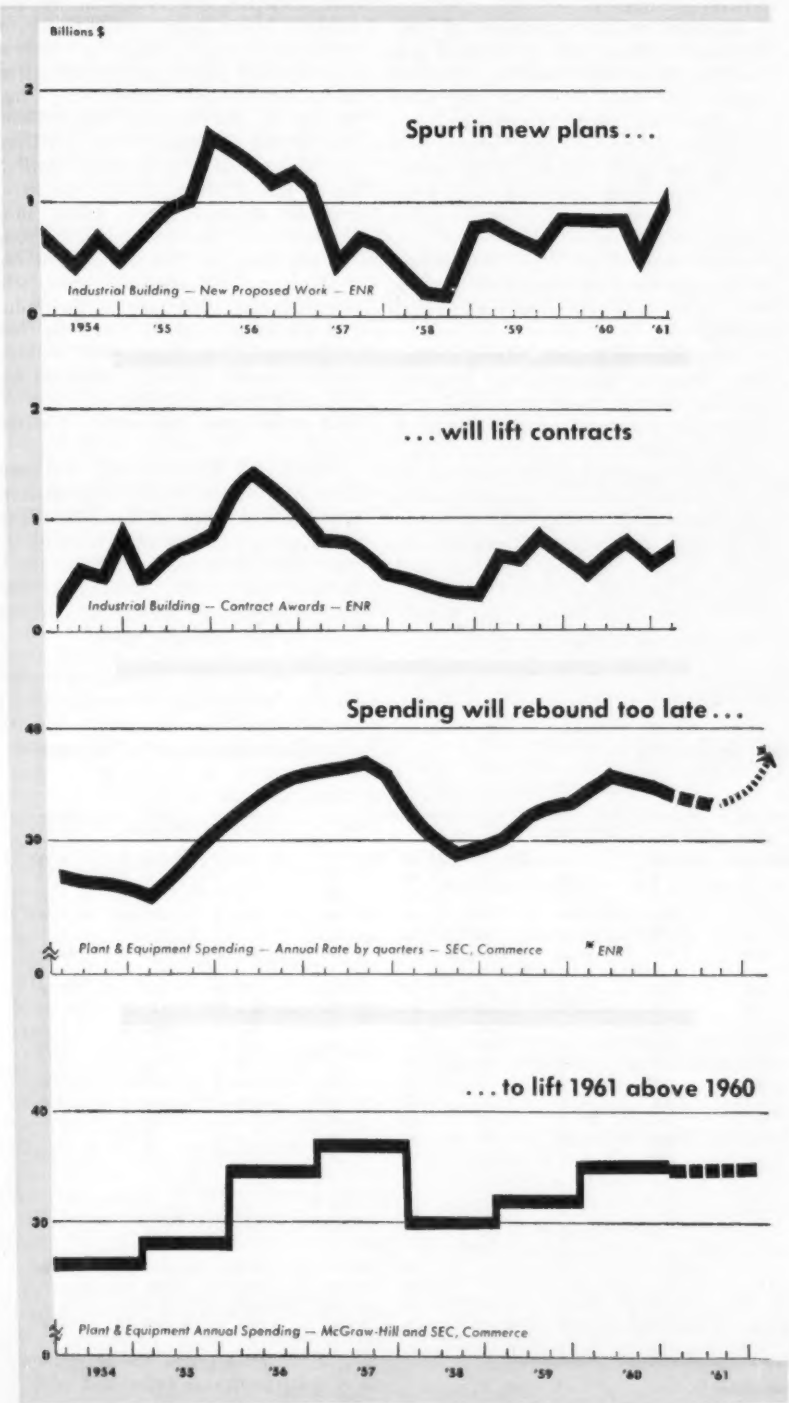
# Industrial Building Bounces Back




The turnaround in industrial building is confirmed this week by the latest McGraw-Hill survey of spending plans for new plants and equipment.

**On the face of it the 1% dip projected for this year's total capital spending hardly augurs well for industrial construction. But behind this over-all figure is news that's likely to startle a few construction men:**

- The current quarter may show the downtrend in capital spending leveling off when final figures are reported this summer to the Securities Exchange Commission and the Department of Commerce.
- Though the year's total may dip 1% below 1960, the second half of '61 is due to bring a sharp rebound in plant and equipment spending.
- The outlook for 1962 is for enough of this same uptrend to establish a new high in capital spending.

**This is welcome reassurance for the construction industry, which has already noted strong evidence of a resurgence in industrial building:** first, in the sharply rising volume of new proposed plants in recent months; second, in the much higher volume of contracts let than in the small first quarter of last year.

**Look for the annual rate of capital spending plans to climb so fast that the fourth quarter '61 rate will come close to the record quarterly pace set in 1957 (see chart).** The emphasis will be on modernization.

This high rate of spending is a relatively new shift in industry's thinking. Only a few months ago a previous McGraw-Hill survey showed that business planned to trim its plant and equipment outlays by 3% this year.

**As the upturn in capital outlays proceeds, engineers and architects can pretty well count on an increasing number of owners knocking on their floors** to design new, more efficient facilities and plants to produce new products.

Historically, the industrial building market moves in waves, or cycles, that last three to four years. Only about one-half the cycle is on the "upside," the balance in a decline. If this pattern holds—as it should—engineers and architects should have a big year for new industrial business. And volume should continue brisk through first half of '62.

**Contractors usually must wait for six**

## . . . Contractors are beginning to feel the industrial pickup

**to nine months of planning time to elapse before the average industrial plant is ready to go to contract.** So they won't feel the real push of the upturn in demand until the second half of '61.

**Meanwhile, though, their new business has been running a healthy 42% above the puny volume of industrial awards reported by ENR in the first quarter of last year.**

**But all of this won't save contractors' 1961 income statements from showing a moderate cut** when it comes to revenues for new industrial and commercial building completed.

McGraw-Hill's survey, conducted in March and early April, shows that all industry's planned outlays for building will drop 3.8% below 1960 to $8.2 billion. (This figure excludes gas utilities' building and construction outlays.)

**The manufacturing segment of U. S. business plans sharp cuts in outlays for structures—19.9%.** The planned 1961 total of $2.23 billion compares to actual outlays last year of $2.78 billion for buildings.

The nonmanufacturing sector of industry, however, will boost its building and construction outlays by 4.1% over 1960 to a total just short of $6 billion. Last year's expenditures were $5.72 billion.

In the nonmanufacturing category, commercial business—large chain, mail-order and department stores, insurance companies and banks—is the single biggest spender. Outlays this year will total $4.92 billion compared to actual outlays last year of $4.65 billion.

One other group, communications and transportation other than railroads, plans a spending boost. Its outlays will rise 8.9% over last year to a total of $403.3 million.

**Sharpest cut in manufacturers' outlays for buildings will be affected this year by the textile industry.** Planned outlays will drop 70% this year from last year's total of $114 million.

Manufacturers of cars, trucks and automotive parts will cut 1961 investment in building from last year's total of $209.2 million to $83.8 million this year, a chop of 60%.

Fabricated metals and instruments producers are third sharpest slashers with outlays cut nearly 40% to $120.2 million.

Miscellaneous manufacturing companies, however, plan a 21.5% boost in building outlays, rising to $280.1 million from last year's expenditures of $230.6 million.

Only three other plus signs show up in the manufacturing group and two are big spenders—chemicals up 6.6% to $249 million; nonferrous metals up 4.8% to $55.2 million, and food and beverages up 1.8% to $182.4 million.

Those planning increases are already showing up in contractors' offices.

"We put more industrial construction contracts on our books in the past 90 days than during the preceding nine months, Mr. J. B. Bonny, president of Morrison-Knudsen Co., Boise, Idaho, reported to stockholders this month.

**But the contract pace doesn't begin to tell the story of the growing strength that underlies the industrial building market.** Many plant construction contracts are negotiated and the construction contract signed when negotiations are successfully completed. What's happening in the area of negotiations? The F. H. McGraw Co., Hartford, may be typical. President Clifford S. Strike tells ENR that his company is currently negotiating on 11 jobs, most of them very large and including some overseas projects. Mr. Strike was one of the few construction executives who perceived the 1961 turn in the industrial building market, when he told ENR last fall that industrial building was a "sleeper" in the construction outlook and should be watched carefully for a probable increase in 1961 contract awards.

And Frank L. Whitney, vice president of Walter Kidde Constructors, subsidiary of Electric Bond & Share Co., reports "definite improvement . . . since the first of the year, especially in the last few weeks. Companies that shelved projects six months ago are now ready to talk business again."

### Capital Spending Plans By Industry — Construction's Share

(billions of dollars)

| INDUSTRY | Actual* 1960 | Planned 1961 | % Change 1960–1961 | Preliminary Plans 1962 | 1963 | 1964 | 1960 (Actual) | 1961 (Planned) | % Change '60 to '61 |
|---|---|---|---|---|---|---|---|---|---|
| **ALL MANUFACTURING** | **$14.48** | **$14.09** | **− 3** | **$13.92** | **$13.60** | **$13.71** | **$2,780.2** | **$2,226.2** | **−19.9** |
| Iron and Steel | 1.60 | 1.18 | −26 | 1.33 | 1.04 | 1.12 | 315.2 | 172.3 | −45.3 |
| Nonferrous Metals | .31 | .31 | 0 | .35 | .41 | .46 | 52.7 | 55.2 | + 4.8 |
| Machinery | 1.10 | 1.14 | + 4 | 1.09 | 1.11 | 1.13 | 226.6 | 223.4 | − 1.4 |
| Electrical Machinery | .68 | .73 | + 8 | .66 | .62 | .62 | 218.3 | 224.1 | + 2.7 |
| Autos, Trucks, and Parts | .89 | 1.01 | +14 | 1.00 | 1.16 | 1.03 | 209.2 | 83.8 | −60.0 |
| Transportation Equipment (Aircraft, Ships, R.R. eq'pt.) | .42 | .40 | − 5 | .33 | .30 | .28 | 167.2 | 112.4 | −32.8 |
| Fabricated Metals and Instruments | .95 | .72 | −24 | .75 | .81 | .79 | 202.4 | 120.2 | −40.6 |
| Chemicals | 1.60 | 1.66 | + 4 | 1.58 | 1.60 | 1.74 | 233.6 | 249.0 | + 6.6 |
| Paper and Pulp | .75 | .68 | − 9 | .60 | .61 | .62 | 114.8 | 74.8 | −34.8 |
| Rubber | .23 | .22 | − 6 | .23 | .24 | .24 | 28.8 | 24.6 | −14.6 |
| Stone, Clay and Glass | .62 | .59 | − 5 | .55 | .55 | .53 | 184.8 | 115.8 | −37.3 |
| Petroleum and Coal Products | 2.64 | 2.85 | + 8 | 2.88 | 2.82 | 2.88 | 256.1 | 182.4 | −28.8 |
| Food and Beverages | .92 | .99 | + 8 | .97 | .85 | .85 | 226.3 | 226.7 | + 1.8 |
| Textiles | .53 | .39 | −26 | .37 | .36 | .36 | 114.0 | 33.9 | −70.3 |
| Miscellaneous Manufacturing | 1.24 | 1.22 | − 2 | 1.23 | 1.12 | 1.06 | 230.6 | 280.1 | +21.5 |
| **NONMANUFACTURING** | | | | | | | | | |
| Mining | .99 | 1.03 | + 4 | .94 | .88 | .91 | 66.3 | 61.8 | − 6.8 |
| Railroads | 1.03 | .69 | −33 | .72 | .71 | .73 | 232.8 | 188.4 | −19.0 |
| Other Transportation and Communications | 5.07 | 4.80 | − 5 | 4.56 | 4.44 | 4.84 | 370.1 | 403.2 | + 8.9 |
| Electric and Gas Utilities | 5.68 | 6.13 | + 8 | 5.74 | 5.82 | 5.92 | 403.3 | 386.2 | − 4.2 |
| Commercial | 8.44 | 8.61 | + 2 | 8.27 | 7.61 | 7.23 | 4,650.4 | 4,916.3 | + 5.7 |
| **ALL BUSINESS** | **35.69** | **35.35** | **− 1** | **34.15** | **33.06** | **33.34** | **8,503.1†** | **8,182.1†** | **− 3.8** |

** U. S. Department of Commerce, Securities and Exchange Commission*
*† Excludes gas utilities*
*DATA: McGraw-Hill Department of Economics*

# Tax Stimulus for Industrial Spending

President Kennedy's plan for spurring plant modernization and expansion would give industry a potential tax-saving of $1.3 billion a year and stimulate plant and equipment spending by an estimated $2 billion to $3 billion a year.

The tax formula proposed allows business-partnerships, proprietorships and corporations—a federal income tax cut of as much as 30% in a given year, Administration officials estimate.

**The construction industry should benefit from this part of the new program.** For one thing the President emphasizes that the program gives companies of all sizes the incentive to expand and upgrade their plant and equipment. Capital investment in used plant and equipment however, would not qualify for tax relief.

Mr. Kennedy figures that half a million jobs would be created by a full year's operation of this program, stemming from the additional expenditures "in the construction, lumber, steel, cement, machinery and other related capital goods industries."

The President made the decision to recommend the tax credit method instead of further liberalization of depreciation allowances.

Deprication allowances entered on company books tend to raise current costs, thus acting as a deterrent to price cuts, according to Mr. Kennedy. He says the tax credit "would not share these defects."

A review of depreciation allowances and the entire tax structure is under way at the Treasury, said the President, and "adoption of the proposed incentive credit would in no way foreclose later action on these aspects of depreciation."

The recommendations are widely opposed by many powerful members of Congress, including those on the tax-writing committees that will first consider the bill. Chairman Wilbur Mills (D., Ark.) of the House Ways and Means Committee has scheduled hearings for next week.

Many businessmen prefer liberalized depreciation to the tax credit already under attack as a "giveaway" to business by Senator George Smathers (D., Fla.), a member of the Senate Finance Committee. It's certain that Walter Reuther, Auto Workers Union chief, will be among those taking the same line. Mr. Reuther is against any tax scheme to stimulate plant expansion, arguing a tax cut to stimulate consumer buying makes more sense at a time when so much of our manufacturing capacity is not being used.

**Mr. Kennedy's incentive plan is accompanied by other proposals which would bring into the Treasury an offsetting amount of revenue.** Among other things, he would:

- Apply 20% withholding rate on corporate dividends and certain interest payments.
- Repeal exemption of first $50 of dividend income and 4% credit against tax on dividend income over $50.
- Ban deductions for such business expenses as entertainment, cost of yachts, hunting lodges and the like.
- Repeal provisions permitting capital gains treatment on income from sale of depreciated property, except on amounts by which sales price exceeds original price.

**In addition, Mr. Kennedy wants to eliminate or reduce the tax advantages of companies operating overseas** or those that established subsidiaries in tax haven countries specifically to avoid paying U. S. corporation income taxes on overseas earnings.

Now, such earnings are not taxed until they are repatriated to the parent U. S. firm.

Mr. Kennedy goes along with those critics who contend that the present law results in huge sums being re-invested in Germany, Japan, and other industrialized countries by subsidiaries of U. S. firms—which turn out products that then compete with U. S.-made products both in the U. S. and third markets.

In sum, the weapon forged to stimulate the economy is a two-edged blade. It would reduce tax liability if capital outlays are boosted; but taxation of earnings of a company's overseas operations could more than offset the tax credit for new investment. And taxation at the 52% corporate income tax rate instead of the 25% capital gains, the rate that is now being used when depreciated property is sold at a profit, would strike hard at many investment builders.

## Kennedy's Tax Credit and How It Would Work

**THE FORMULA:**

- You can deduct 10% of the first $5,000 of spending on new plant or equipment, regardless of your depreciation account.
- You can add to this 6% of plant and equipment spending that exceeds 50% of your depreciation allowance, up to 10% of such allowance.
- You add to this 15% of the spending that is in excess of the year's total depreciation allowance.

Expenditures that qualify: Assets with a tax life of six years or more, purchased after Jan. 1, 1961; only new plant and equipment qualifies, not used; it must be located in the U. S., not abroad; and the maximum credit is 30% of the tax bill.

**HOW IT WORKS:**

**Example A:** A small contractor spends $5,000 on new equipment. He could subtract 10% of this, or $500, from the tax bill he would otherwise pay. Thus, he would be out of pocket only $4,500 for his new equipment. (The 30% maximum means that he would have to have a tax bill, before the credit, of around $1,700. If his tax liability should be only $1,000, before credit, under the same set of circumstances he would be entitled only to 30% of $1,000, or $300 as a credit. Thus reducing his tax bill to $700.)

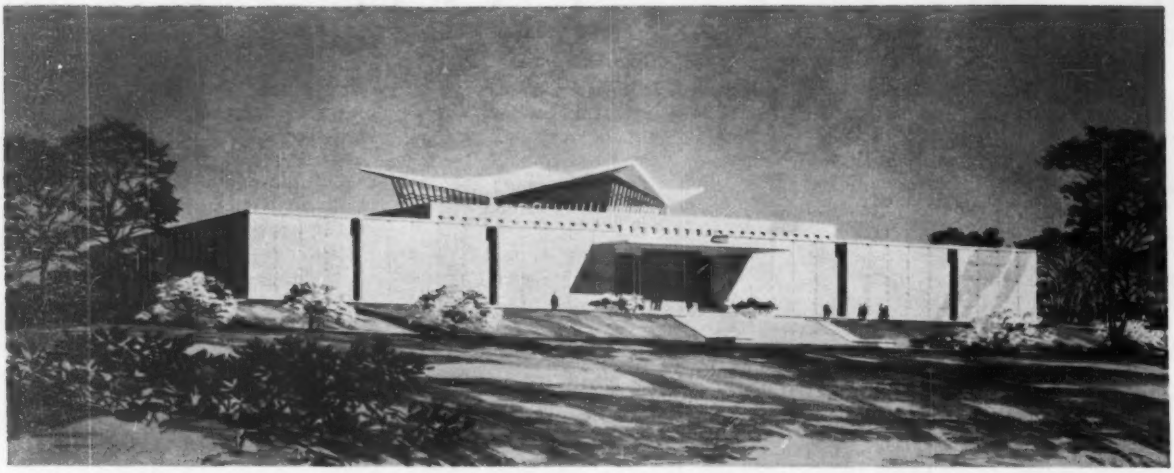
**Example B:** A larger contractor spends $60,000 for new equipment; his depreciation allowances for the year are $100,000, because of a surge of expansion a few years ago. He would take 6% of the amount by which his spending ($60,000) exceeds 50% of its depreciation allowance of $100,000—which comes to $50,000. Thus, 6% of the $10,000 difference is $600, which is part of the credit it would be able to subtract from its tax bill.

In addition, it would add 10% of the first $5,000, or $500, as illustrated in the first example. Thus the total credit for our second firm is $1,100 ($600 plus $500).

**Example C:** A company spent $2 million for new plant in a given year, and has depreciation allowances of only $1 million.

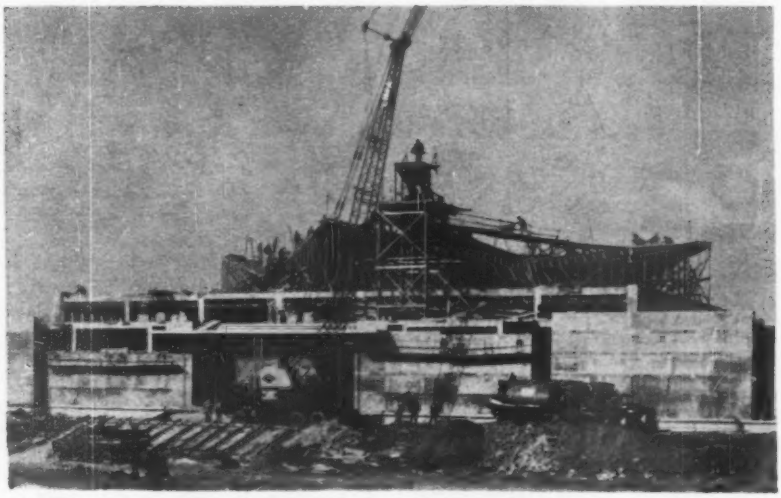
First, it would take the same $500 based on its first $5,000 of spending. Then it is entitled to 6% of the amount that falls between 50% and 100% of its depreciation allowance—which turns out to be 6% of $500,000 or a subtotal of $30,000.

Then it adds 15% of the excess of its spending over its total depreciation allowance—15% of $1 million, in this case, or $150,000. Adding all these together ($500, $30,000, $150,000) and the company cuts its tax payment by $180,500.

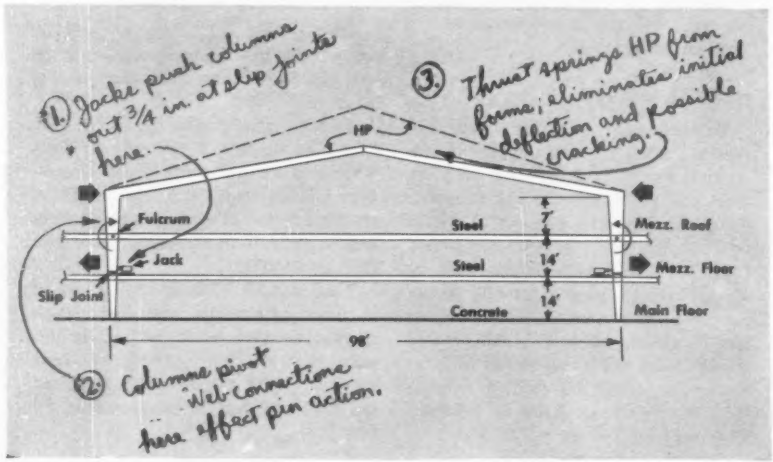


**National Library of Medicine will be capped with a thin-shell concrete hyperbolic-paraboloid roof.**

# Jacks Will Prestress HP Roof



**FORMS** for the HP will be stripped after the roof is prestressed.




**COLUMNS** will act as levers in compressing the roof.

A roof of spectacularly bold design entered the first stage of construction last week. It's a 9,500-sq ft concrete hyperbolic paraboloid carried by four steel columns. The roof, though only 3 in. thick, spans 98 ft. Construction will come to a climax about June 1 when jacks will force the columns outward as cantilevers, applying compressive forces to the HP roof.

The objective: Prestress the shell and at the same time spring it off its forms. The job: The National Library of Medicine at the National Institute of Health, Bethesda, Md.

This month the Arthur Venneri Co., Washington, D. C., placed 185 cu yd of concrete in the rib framing. The frame consists of perimeter shear beams and transverse interior ribs of a four-quadrant HP roof, square in plan, that measures 98 ft on each side. The thin-shell HP, floating above the main roof of the new building, is the capstone of a $7.5-million library designed to house more than 1 million medical volumes.

The sprawling structure measures more than 190x275 ft, extends three floors below grade and two floors above. Up to and including the main floor, it is reinforced concrete; above this level, it is steel framed. Steel columns extend from the main floor through the mezzanine floor and flat mezzanine roof up to the four valley points at the perimeter of the HP roof.

The prestressing operation is scheduled after the shell concrete has attained its 28-day strength. The jacks will force the column bases outward at horizontal slip joints just above the mezzanine floor. The columns will pivot about hinged connections at the mezzanine roof level 14 ft above. Seven

feet above the mezzanine roof, the column levers, acting through shear head connections, will compress the interior valley ribs.

This compressive action inward at the four column tops will spring the 9,500-sq-ft roof off the forms under it. The idea is to prestress the shell enough to eliminate the initial deflection—and later cracking—that sometimes takes place when forms are pulled out from under HP shells.

The engineers calculated the ¾-in. outward movement of each column at the mezzanine floor as just enough to release the shell's dead load from the formwork beneath it.

Earlier plans had called for longitudinal center-line construction joints in the interior ribs. These joints are to permit separate functioning of the half-ribs while concreting the shell checkerboard-fashion, two alternate quadrants at one time and the remaining two after a wait of at least three days.

Rib construction was changed to monolithic to obtain greater strength, and pneumatically applied concrete was substituted for ready-mix in the shell. But workmen will still concrete the shells in accordance with the checkerboard system.

Spraying of the shell will take place within the next two weeks. In accordance with specifications, the contractor is waiting for 14-day, 3,000-psi cylinder tests before loading the rib frame with the shell concrete. Then carpenters will align framework with the deflected ribs, place pressed wood lining on the forms and ironworkers will begin setting reinforcing bars.

With good results from cylinder tests of the sprayed-on concrete, the contractor will stress the HP roof and weld the open jacking joint of the massive steel columns three weeks later.

To permit jacking of the built-up steel columns, which are more than 35 ft tall, the columns are severed and fitted with graphited slot-bolted plates at the mezzanine floor level. Temporary steel ribs, bolted to the lower fixed sections of the columns at the mezzanine floor, will support the hydraulic jacks at this level.

Jacking outward at the lower ends of the severed sections will induce bending stresses in the cantilever column sections and compress the HP roof. For this operation, the steel frame of the building at the mezzanine floor level acts as the compression ring, while similar mezzanine roof framing serves as the tension ring at the fulcrum level.

R. B. O'Connor and W. H. Killiam, Jr., are the architects. Severud-Elstad-Krueger Associates are the structural engineers.

Fabricators Steel Corp., Bladensberg, Md., the steel subcontractors, will perform the roof jacking operation.

## Derrick With 170-ft Boom . . .

## . . . Starts Dodger Stadium Erection

The superstructure of the $16-million Los Angeles Dodgers' Stadium began to take shape this month when erection of 23,000 major precast grandstand units got under way.

A stiffleg derrick, equipped with a 170-ft boom operating from a rail-mounted tower, will erect most of the 23,000 major precast members. The heaviest precast units, fabricated in a five-acre casting yard carved out of the mountainous Chavez Ravine site, will be lightweight concrete bents weighing 32 tons.

The completed grandstand will have three main cantilevered tiers, topped by a partial roof about 160 ft above the diamond. The stadium will seat 56,000 fans on completion, which is scheduled before the opening of the 1962 baseball season. The plans provide for eventual expansion to 85,000 seating capacity.

The final project requires a mammoth earth-moving job of 8 million cu yd to accommodate the stadium, terraced parking lots for 16,000 cars, and interior roads. Some 40,000 cu yd of concrete and 6,000 tons of reinforcing steel will go into the foundations and superstructure, most of which will consist of precast concrete.

Praeger-Kavanaugh-Waterbury are architects-engineers. Vinnell Steel of Irwindale, Calif., is erecting the grandstand; Vinnel Contractors of Los Angeles have the contract for the final 5.6 million cu yd of earth moving.

# Big Coast Sewerage Jobs Get Rolling

The two biggest sewerage construction schemes in the Far West are set to roll this spring. A bid call this month in San Diego kicked off a $50-million collection and treatment program. At the other end of the Pacific Coast, Seattle announced a May bid call on the first contracts for a $118-million, 10-year pollution abatement program.

**The San Diego project is the culmination of a 10-year effort to end pollution of San Diego Bay.** The existing 40-mgd sewage treatment plant near downtown San Diego was built before World War II. Although expanded right after the war, the plant has been inadequate for many years.

The new system, which will serve the 440-sq-mi San Diego Bay area, is designed around a treatment plant with an initial capacity of 132 mgd, expandable to 242 mgd.

Population of the area, now about 1 million, is expected to hit 2.5 million by the year 2000 and the new system is keyed to this growth.

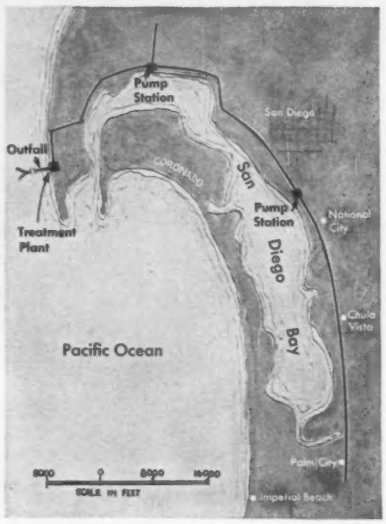
The improvement program involves construction of two pumping plants, a 2.5-mile ocean outfall, and about 24 miles of interceptors and tunnels ranging in size from 51 in. to 126 in.

Bid openings on several contracts are planned for June. Some awards and sale of a $42.5-million bond issue are slated for June 20 (not June 6, as previously reported in ENR's April 13 issue). Other bid openings will follow in July with the entire construction program to be under way by August.

The existing sewerage system is owned by the City of San Diego, but contracts have either been signed, or will be negotiated soon, with six suburban cities that lie along the crescent-shaped bayshore—National City, Coronado, Imperial Beach, Chula Vista, La Mesa and El Cajon. Three sanitation districts will participate while two outlying districts are expected to tie in later. Capacity has also been provided for Tijuana just across the border in Mexico.

The treatment plant will be located on 43 acres leased from the Navy on Point Loma, a peninsula that hooks down to form the seaward side of the entrance to San Diego Bay. The plant will provide primary treatment, and effluent will be discharged to the Pacific Ocean through a 114-in.-dia ocean outfall. The city has an option on 90 additional acres if secondary treatment becomes necessary in the future.

Due to the restricted area of the site the plant will have very large sludge digesters. Six 125-ft-dia units with wire wrapped prestressing are designed to handle the 242-mgd ultimate capacity. Digester walls will double as retaining walls at the steep, cliffside site. The plant will have six rectangular sedimentation basins. Digester gas will fire an incinerator installed to control odors. Sludge will be used for land reclamation.




**SAN DIEGO PLAN** includes suburban cities all linked to big new treatment plant.

Since the plant will perch 90 ft above the water's edge, getting effluent from the plant into the outfall without entraining air has presented a major design problem. No bubbling at off-shore diffusers is allowed. Since initial flow will be around 50 cfs and ultimate flow 612 cfs, various schemes for dropping the effluent to the outfall were explored.

The designers, Holmes & Narver-Montgomery, decided on a throttling valve arrangement using butterfly valves. This throttling valve structure will be housed in a 36-ft-dia concrete silo, which will stand 81 ft high.

The throttling valve system works like this: Effluent flows from the sedimentation basins to an intake gate structure at the top of the silo. It then drops in two penstocks through the butterfly valves—there are two, each capable of handling full capacity—and directly into the outfall.

These valves operate in parallel. If one fails to function, the other automatically takes over through an electromechanical control system. If both valves fail, effluent can be discharged directly into the outfall through a service access to the outfall. This emergency overflow is a vertical extension of the outfall.

The interceptor system includes tunnels. One is a 4,177-ft, 120-in.-dia tunnel on Point Loma; the other—called the Downtown Tunnel—is in two sections. One is a 7,757-ft-long, 96-in.-dia bore; the other, a 1,040-ft-long 90-in. bore.

Holmes & Narver-Montgomery is a joint venture of Holmes & Narver, Inc., Los Angeles and James M. Montgomery, Pasadena. Completion of their San Diego project is set for early 1963.

**In Seattle within the next week or two, the Municipality of Metropolitan Seattle will call for bids on 11 projects costing nearly $7.5 million.** This represents the initial phase of a 10-year program that will cost well over $100 million according to a spokesman with Metro, the regional agency.

The 10-year construction plan to start next month is the first stage of an overall comprehensive program that will be in progress for the next 35 years (ENR May 29, 1958, p. 24). The Metro plan is based on an engineering study completed in 1958. The study was performed by Brown & Caldwell, San Francisco consultants, and covered a 575-sq mi area in and around Seattle.

A June 1 bid opening is set for this initial stage. Soon after this, bids will be called for a $20-million bond issue to finance the work. Major projects involved in the June openings:

- A three-mile stretch of 90- and 108-in. interceptor sewer along the east side of Lake Washington.
- Site preparation for the 24-mgd Renton activated sludge plant.
- Influent and effluent sewers at this plant site.
- Two small primary treatment plants on Puget Sound north of Seattle; one a 3.5 mgd unit, the other 3.2 mgd.
- Two $100,000 pump stations.

This work is expected to start in July provided bond bids are favorable.

Next fall, Metro will take bids on two other large contracts. A two-mile-long, 90-in.-dia tunnel will link the Lake City district with Seattle's North Trunk sewer at an estimated cost of $4.5 million. The other contract is for a 7,000-ft-long, 90-in.-dia sewer to cost around $2.8 million.

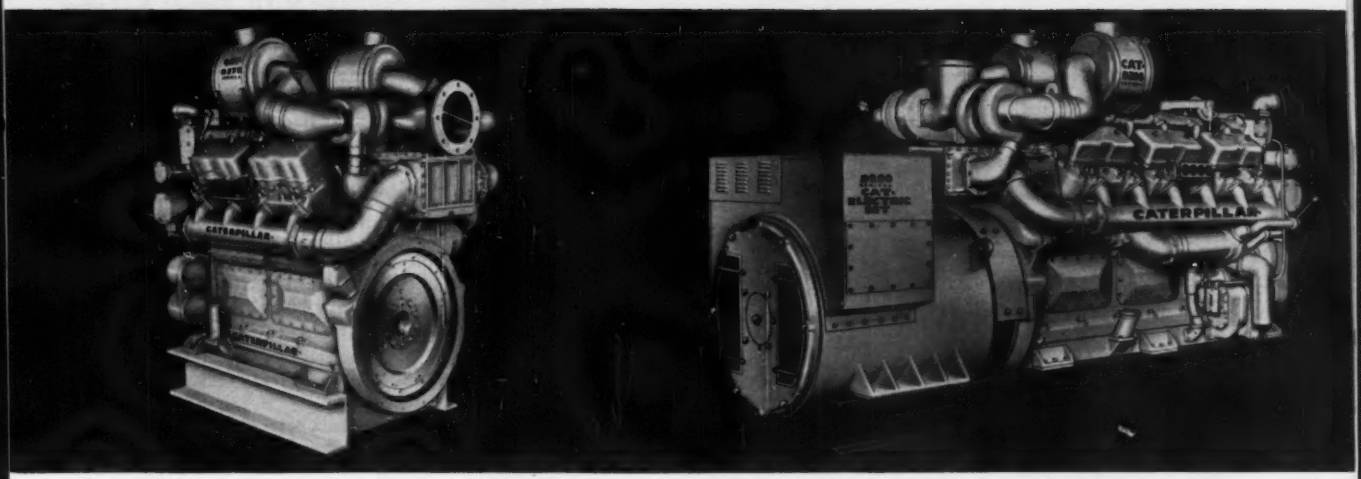
During 1962 Metro plans to advertise two $10-million treatment plants. One of these is the Renton plant, the other a 125-mgd primary treatment plant at West Point on Puget Sound.

Bond retirement for the program will be through a $2.00 per month service charge levied on each customer in the 11 municipalities with which Metro has contracted to provide sewage disposal.

Since the initial study, engineering services have been provided by Metropolitan Engineers, a joint venture of Brown & Caldwell, R. W. Beck & Associates, Carey & Cramer, and Hill & Ingman. The last three firms are all from Seattle.

# engine power BY CATERPILLAR

# new Cat D398-D379




**Cat D379 Industrial Engine. The 6.25" bore, 8.00" stroke D379 and D398 both offer the latest in attachments including marine gears and generators. The D379 Electric Set develops up to 350 KW continuous, 400 KW standby.**

**Cat D398 Electric Set. The D398 Electric Set shown here with Static-Regulated, Static-Excited Generator features a new generator with built-in static excitation system with no exciter generator or vibrating parts. Develops 500 KW continuous, 600 KW standby.**

## Give more horsepower per pound, per dollar than any other industrial engine in their class

The V12 D398 and the V8 D379 are rated at 950 and 630 maximum HP, respectively. Electric set versions reach to 600 and 400 KW. Marine ratings exceed 1000 HP. These engines are now available at prices that are less than crankshaft replacement prices of some competitive engines in their class.

Published list prices show the D398 to be thousands of dollars less than the next lowest priced industrial engine that will develop comparable horsepower. Other advantages are quality aluminum alloy bearings, aluminum pistons with cast-iron ring band for top two compression rings, drop forged-dynamically balanced crankshaft and high strength rigid block. These engines save in space and weight, too . . . with at least 35-40% less size and 4800 pounds less weight than other makes with comparable horsepower.

## Here are more reasons why Cat D398 and D379 Diesels and Electric Sets give you extra value

### NEW PERFORMANCE STANDARDS

- Turbocharged-Aftercooled design
- Static-Regulated, Static-Excited Cat Generators
- High flow lube and water systems
- Ability to burn wide range of fuels

### NEW ENGINE FLEXIBILITY

- 100% HP from either end of engines
- Six available accessory drives – up to 50 HP each
- Controls available for either side
- Standard (counterclockwise) rotation or opposite rotation

### NEW SERVICE EASE

- Fuel or lube filters serviced from either side
- Remove heads without disturbing manifolding
- Easily inspect or remove pistons, rods and bearings through large side ports
- Externally mounted oil pumps for easy inspection and maintenance

For complete specifications on the D398 and D379 Diesel Engines or Electric Sets, contact your Caterpillar Dealer or Caterpillar Engine Division, Peoria, Illinois.

**CATERPILLAR**

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Caterpillar Tractor Co., Engine Division, Peoria, Illinois, U. S. A.

# Kennedy Names Corps Chief

Maj. Gen. Walter K. Wilson, Jr., 54-year-old commander of the Army Engineer Center at Ft. Belvoir, Va., and a well known military figure in construction industry circles, was named Chief of Army Engineers last week.

He succeeds Lt. Gen. E. C. Itschner who has become chief technical adviser to the West Pakistan Water and Power Development Authority on the Indus River project.

General Wilson takes over at a critical time for the Corps of Engineers. For almost a year, the organization has been buffeted in a Washington flap over alleged delays in construction of Atlas and Titan ICBM bases for the Air Force.

Last month, the Corps' Ballistic Missile Construction Office, headquartered in Los Angeles and headed by Brig. Gen. A. C. Welling, was removed from the Army's chain of command and placed under the Air Force's "operational control." General Welling's office was set up last August in an earlier Pentagon effort to centralize management of and to expedite construction of ICBM sites.

The Pentagon is still ironing out the details of the latest organizational overhaul to determine how much responsibility—if any—the Corps retains over ICBM projects.

On the surface, however, it already appears that the Corps as an organization has been squeezed out of its traditional management role in what is now and will continue to be for many years the major military construction program.

General Welling's office, which consists of over 500 of what one high-level Pentagon official describes as "the best people drawn from the Corps' division and district setup," will be operating as an integral agency of the Air Force Systems Command. Its relationship to the Army is limited to what the Pentagon calls "administration and support."

"The Army Corps of Engineers' future," a Washington official involved in military construction affairs told ENR, "will depend on how forceful and dynamic the new Chief can be in keeping the Corps intact."

In its traditional role, the Corps of Engineers has been responsible for construction of military and civil defense works in wartime, and for flood control and water resources development in peacetime.

The Corps' new Chief, has been nominated by President Kennedy for promotion to the grade of lieutenant general. As Ft. Belvoir commander for the past eight months, General Wilson has been aloof from the controversy raging over management of ICBM base construction.

Maj. Gen. Walter K. Wilson, Jr.

But in his previous assignment—as the Corps' assistant and later deputy chief for military construction during May 1956 to August 1960—the general was a key figure in mapping plans for the missile program.

During World War II, the new Chief had combat assignments with the Atlantic Fleet's Amphibious Corps and in the India-Burma Theater. He was commander of all U. S. ground forces in the theater and served as chief of staff of the Chinese army in India.

Following the war, General Wilson was the Army's District Engineer at St. Paul, Minn., and Mobile, Ala., working on construction and operation of flood control and navigational structures and Division Engineer at Atlanta, Ga., in charge of a combined civil works and military construction program of $500 million annually.

In 1953, General Wilson was placed in charge of military base construction in North Africa as the Corps' Division Engineer for the Mediterranean area with headquarters in Morocco. Two years later he became commander of an Engineering Brigade at Ft. Leonard Wood, Mo.

General Wilson was born in Ft. Barrancas, Fla., the son of an Army general. He is a 1929 graduate of the U. S. Military Academy, has a B. S. degree in civil engineering from the University of California, and has studied civil engineering at Cornell University.

He is a member of the Society of American Military Engineers and the American Society of Civil Engineers, and is a registered civil engineer in Alabama.

## Biomedical Engineering? Courses Start in the Fall

Johns Hopkins University has announced plans for a new kind of graduate course, combining engineering and medicine. It will start in the fall.

Called Biomedical Engineering, the course will consist of a four- or five-year program of graduate study leading to a doctor's Degree in Engineering.

According to Dr. Samuel A. Talbot, an associate professor of medicine and one of the innovaters of the program, the course will be based on the fact that the function of a living thing and its different parts involve certain principals that engineers use in designing inanimate structures and systems.

Students of the new discipline will spend two years studying engineering courses, then a half year studying physiology and biochemistry alongside medical students. After that, a half year will be spent applying engineering principles to biological systems. The fourth year will be devoted to thesis writing and a fifth year of research may be added.

The University of Pennsylvania and the University of Rochester will offer similar programs in cooperation with Johns Hopkins.

## Decision Delayed on Rapid Transit for Golden Gate

A decision on the request of the San Francisco Bay Rapid Transit District to install rapid transit rails on the Golden Gate Bridge won't be announced until mid-summer or later.

Managers of the Golden Gate Bridge and Highway District have engaged Clifford E. Paine, superintendent of the original Golden Gate Bridge construction project, to review an engineering report that says rails could be installed on the 24-year-old bridge without damaging its structure or its appearance.

The report is the result of a 14-month study by Steinman, Boynton, Gronquist and London, New York engineering consultants engaged by the rapid transit group.

Although the directors of the bridge are friendly toward the rapid transit proposal, they are unwilling to give immediate endorsement to the consultants' finding. "It took them 14 months to come up with that report and we're not about to dispose of it one way or the other in 15 minutes," said one of the directors.

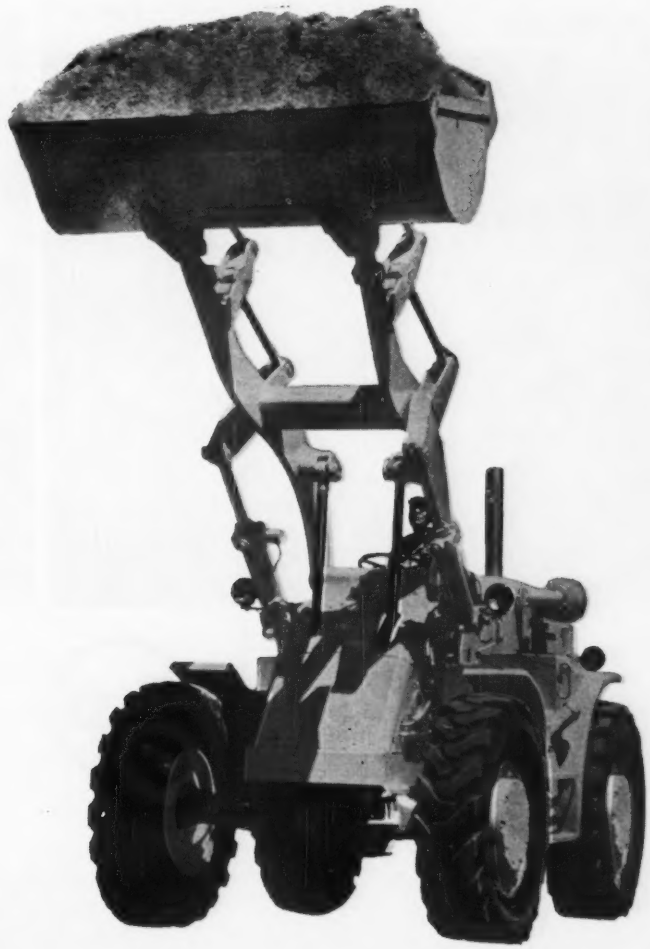
Mr. Paine estimated that it will take him four months to prepare his review of the report.

Reconstruction of the bridge for rapid transit rails will cost about $9 million and will be borne by the Bay Area Rapid Transit District. The work would take 18 months to complete.

# Caterpillar builds extra strength into critical parts with

**USS Special Steels** — Rugged and brawny Caterpillar equipment is built with utmost care, from main frame to pinions. Their new Traxcavator illustrates the point. Bucket lift arms, links, and parts of the bucket are made from USS MAN-TEN High Strength Steel which is 50% stronger than structural carbon steel and has much greater abrasion resistance. Result: more capacity . . . increased reach and dumping height . . . stronger construction . . . better balance . . . lower operating and maintenance costs. ☐ In other parts of the machine, strong, tough, wear-resisting USS Alloy Steels are used to withstand the most critical shocks and stresses. Every pound of alloy steel used in construction equipment pays for itself many times in longer life and freedom from repairs. ☐ United States Steel makes a complete family of these special steels which are being used to build stronger, longer-lasting equipment. USS MAN-TEN, USS COR-TEN and USS TRI-TEN brands of high strength steels have a minimum yield point of 50,000 psi up to ½" thick. They can be used either for greater strength or for weight reduction with increased payloads. MAN-TEN Steel's strength, high abrasion resistance and low cost make it widely used in earthmoving equipment. ☐ COR-TEN Steel offers strength plus outstanding resistance to atmospheric corrosion, abrasion and fatigue. Also, paint coatings on COR-TEN Steel last up to 50% to 100% longer than on ordinary carbon steel. ☐ TRI-TEN Steel has strength combined with superior toughness, especially at below zero temperatures. It has excellent weldability, good resistance to abrasion, corrosion and fatigue.

**USS United States Steel**



see next two pages

# USS Special Steels put more strength–more impact

**Bulldozers** ram into rock and take shock loads as tough as they come. This Cat D-8 Tractor has a blade assembly built with USS MAN-TEN High Strength Steel in the C-frame, the end plates and stiffeners on the back of the mold board. MAN-TEN Steel delivers 50% more strength with attendant greater endurance limit than carbon steel. **Scrapers** are built big and rugged for high production. This Cat 491 Scraper hauls more payload—34 cu. yd. heaped—because the bowls are made of USS MAN-TEN High Strength Steel. Extra strength combined with abrasion resistance assures greater payload, less weight and long life. All Cat scrapers make extensive use of USS High Strength Steels. **Rippers** crumble stubborn terrain fast! Brute strength is needed here along with plenty of abrasion resistance. The rugged beam holding the ripper shank is USS MAN-TEN High Strength Steel, the shank is a tough alloy steel and the points are heat-treated alloy steel. **Tractors** take constant punishment and Caterpillar design en-

**Bulldozers**

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# resistance–more durability into construction equipment

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**Rippers**

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USS **United States Steel**

*Working under Manhattan . . .*

# Crowded Earth Puts Squeeze on Subway

Contractors began work last week on a New York City subway tunnel that will be shoehorned in to run parallel under two commuter railroad tracks, edge between two existing subway tracks and cross under another subway line at right angles—all this without disturbing the operation on any of them or interrupting traffic on the street above.

The tunnel, an extension of the city's Independent line, will run 80 ft below Manhattan's 6th Ave., from West 4th St. in Greenwich Village to West 34th St. in the Macy's-Gimbel's neighborhood, a stretch of about 1¼ miles. It will cost $22 million and take three years to build.

A joint venture, made up of MacLean-Grove & Co. and Grove, Shepherd, Wilson and Kruge, Inc., both of New York, has a $9.7-million contract with the New York City Transit Authority to build the first section, a 2,560-ft stretch between West 9th St. and West 19th St.

The Transit Authority advertised the second section, from West 19th St. to West 31st St., for bids last week. The bids will be opened June 2.

When the city built the Independent line in the '30s, a shortage of funds led it to reduce the four-track layout (two for local, two for express) all at the same level to two local tracks at West 4th St. These two local track tunnels were built on either side of and slightly lower than the shallow Hudson and Manhattan Railroad tunnel, which enters from the southwest under 6th Ave. at West 9th St.

Extension of the two terminated express tracks northward means that as they dip downward, away from the H&M tracks, the roof of the new tunnel will merge with the bottom of the H&M tunnel. This will demand a complex system of underpinnings.

The contractors, known as MacLean-Grove-Shepherd, will begin the work by sinking a shaft at West 13th St., just west of 6th Ave. They will tunnel east to the proposed tunnel center line and then work to the north and south simultaneously. This will enable them to back into the underpinning work for the H&M tunnel.

Water conditions and fault areas will necessitate compressed air construction in about one-quarter of the length of the first tunnel section, according to Harry Newman, division engineer of the Authority's construction division.

In areas where the rock (unpredictable Manhattan schist) is firm, the builders will line the tunnel with concrete and install a center concrete wall to form twin parallel tunnels. In less dependable sections they will use steel bent construction, 33-in. I-beams at the roof supported by vertical 12-in. I-beams at the side, at 5-ft intervals.

"Tunneling in New York is seldom an easy job," says Norman Nadel, resident engineer for MacLean-Grove-Shepherd. "This project will take a lot of very, very careful planning, particularly in equipment selection and plant set-up.

"Getting rock out and storing material will be difficult. There are buildings lined up all along the route. Another complication is that we won't be able to blast when a train is overhead."

The 6th Ave. Independent line tunnel is part of an $80-million program that will link the Independent line with the Brooklyn-Manhattan Transit line. By rerouting and interchanging trains on the two lines, the Transit Authority hopes to put 45 additional trains on during rush hours, increasing subway capacity by 90,000 more passengers an hour by 1964.

*General Accounting Office tells Congress . . .*

# BPR Should Allot More for Research

The General Accounting Office (GAO), which keeps an eye on government spending for Congress, has taken the Bureau of Public Roads and the states to task for not allotting enough money to highway research.

In a report to the Speaker of the House and the President of the Senate, GAO says research activities have lagged behind the accelerated federal-aid highway program for the past four years. Furthermore, BPR has no effective plan to step up research efforts, the report says.

GAO recommended that Congress consider amending existing legislation to encourage the states to use more of available federal highway funds for planning and research.

Under present law, up to 1.5% of the annual apportionments to states may be used for planning and research projects approved by the Secretary of Commerce. These funds are available for obligation by the states for a period of two years. Any amounts not obligated at the end of that period lapse.

The use of these funds is not mandatory, however, and the states may even divert the money to construction. From April 1955 through December 1960, $39.3 million available for planning and research was used instead for construction. In addition, a total of $76.5 million in these funds had gone unobligated at the end of last year.

Of more than $10 billion in all types of highway funds apportioned to the states in the past four years, an average of only .18% has been used for research purposes.

GAO said it believes that states should be required to participate in highway research programs "in proportion to their resources and highway requirements."

To keep states from advancing construction at the cost of research, it recommended that Congress require that planning and research funds be used for those purposes only. Furthermore, it said, a stated percentage of these funds should be used for research only. Planning funds are used by the states for engineering and economic investigations, which lay the foundation for future road programs in formulating highway budgets and in determining equitable sources of revenue.

BPR does not concur in GAO's recommendation that legislation be resorted to as a means of obtaining greater research efforts. It would rather continue to work with the Highway Research Board and the American Association of State Highway Officials under existing legislation in seeking more state research.

GAO also complained that BPR's own spending on research has been too niggardly. Congress allots it an overall amount for administration to the highway program and leaves it up to the bureau to use a certain portion of this for research projects.

Although administrative funds have increased substantially in the past four years—from $13.4 million in 1957 to $26.5 million in 1960—the percentage set aside for research has decreased—from 23% in 1957 to 18% last year.

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**Roof rests on four points near center of building and on four buttresses outside end walls.**

# Steel Space Frame Folds and Holds

It won't fly, but the steel framed roof hovering over a synagogue in North Miami Beach give the appearance that it might to a visitor. The welded and bolted frame touches the building at only four points near its center and at four other supports set outside the building line.

The Beth Torah Temple at Monticello Park Jewish Center is symmetrical about a center line cutting through its two high concrete entrance arches. Temples open off of a common vestibule running across the building.

The roof over each building half is formed as a screwed square in plan but is folded into eight triangular plates in the structure. Ridges on the diagonals of the square extend beyond the building's sides, and form a common ridge on the long axis of the entire double structure.

All bearing points are at the low, outer ends of the valley beams. Four are near the center of the building on pedestals combined with the entrance arches, the other four are freestanding buttresses at the inset corners of the building.

The 224-ft-long main ridge beam and both 139-ft transverse ridge beams get no direct support from the ground. They are carried at their outer ends by the perimeter beams and at the center of each building half by the upper ends of the four valley beams.

In this framing arrangement, ridge beams are in tension and bending. The perimeter beams act in compression with bending; valley beams act in compression alone. Bar joists at 4 ft c-c span at right angles from the ridge beams to the valley and perimeter beams.

Because of the shallow space frame arrangement—rise from supports to ridge of the roof is only 8 ft—the buttresses at the lower end of the valley and perimeter beams are designed to resist a combined 157-kip horizontal thrust from these members.

The ridge beams—heaviest members in the structure—are framed by 33WF-152 sections with 3 x 3 x ¼ angles welded to the web root. Ridges are designed as simple beams under a uniformly varying load. And they are calculated to carry an added tensile force of 157.6 kips along their length.

Perimeter beams—27WF94s—are stiffened with 3 x 3 x ¼ angles welded to the inside of the flange edges. Valley beams are 30WF116 sections.

Bracing members stiffen each framing joint. Lengths of 18WF70 are bolted at 45 deg at each perimeter joint. At the center points where valley and ridge beams meet, 10WF21s bolted to the beam webs form a hexagon around the joint.

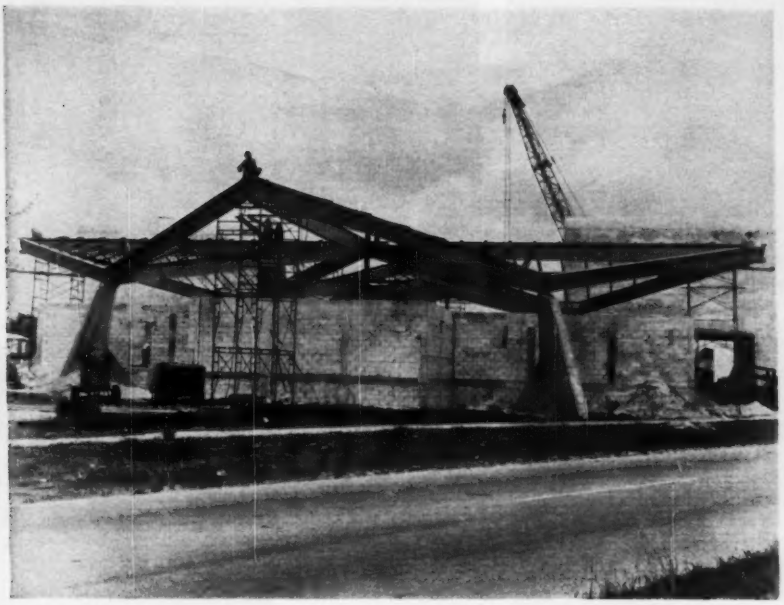
Both welded and bolted connections were used during erection. The steel contractor, working with a truck crane, erected the ridge beams first. These were held on falsework towers at the outer ends and on temporary posts at the center points of each building half. After the frame was completed and the temporary supports removed, there was a ⅝-in. deflection at the outer ends of the ridge beams.

In the completed building, hammer surfaced amber glass panels fill the 14-ft-high space between roof and masonry block walls. These panels bear completely on the wall tops with slip joints at the roof juncture.

The roof is a 2-in. thick, wire-reinforced gysum slab over 1-in.-thick form board. Bulb tees at about 3-ft c-c carry the form board and slab on the bar joists. A standing seam tern covering sheathes the completed roof.

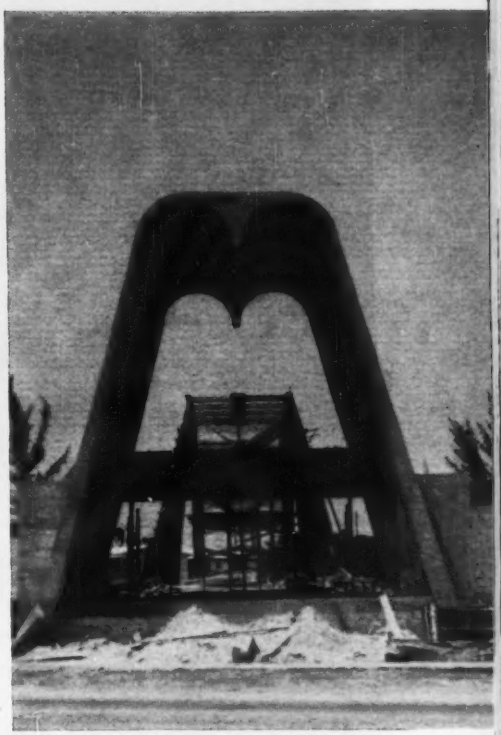
The reinforced concrete arches at either side of the building stand 36 ft high with a spread of 35 ft at grade. Wall thickness tapers from 16 in. at the base to 6 in. at the crown. The contractor made a single set of forms for the two entrances and cast first one, then the other, dismantling the forms between each part of the work.

The temple cost $336,200. The structural steel came to $39,741 of this total. Architect for the center was Phillip Pearlman, North Miami Beach. Gerald Spolter, Miami Beach, was the structural engineer. Stotter Construction Co., North Miami Beach, was the general contractor. Jafra Steel Corp., Miami, fabricated the steel.



Frame spans 64 ft with 32-ft overhang, but rises only 8 ft.

# Synagogue Roof



Concrete arches form entry.

Gypsum slab and tern sheathing cover the frame. Inside, ceiling follows roof form.

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2

3

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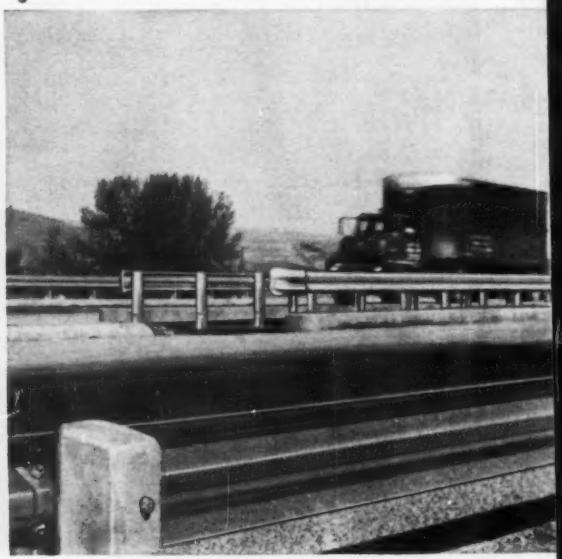

5

6

1 FLEX-BEAM gives median strip protection on Interstate 85, Georgia.

2 Near junction of Interstate 35W and Interstate 494 in Minnesota FLEX-BEAM serves as traffic guide as well as protective rail.

3 Armco FLEX-BEAM on Interstate 20, Texas.

4-5 Bridge railing on Interstate 75, Ohio and Interstate 80, Montana, is Armco FLEX-BEAM.

6 Armco FLEX-BEAM serves as protection around bridge pier on Interstate 75 in Ohio.

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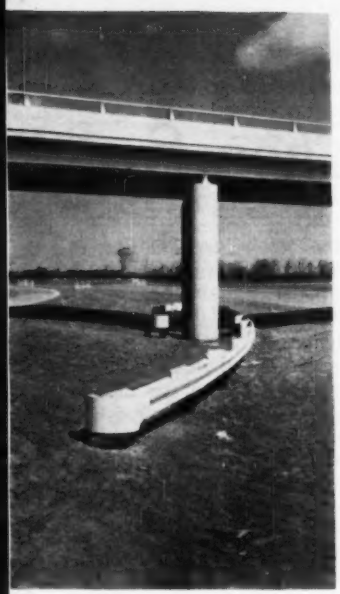

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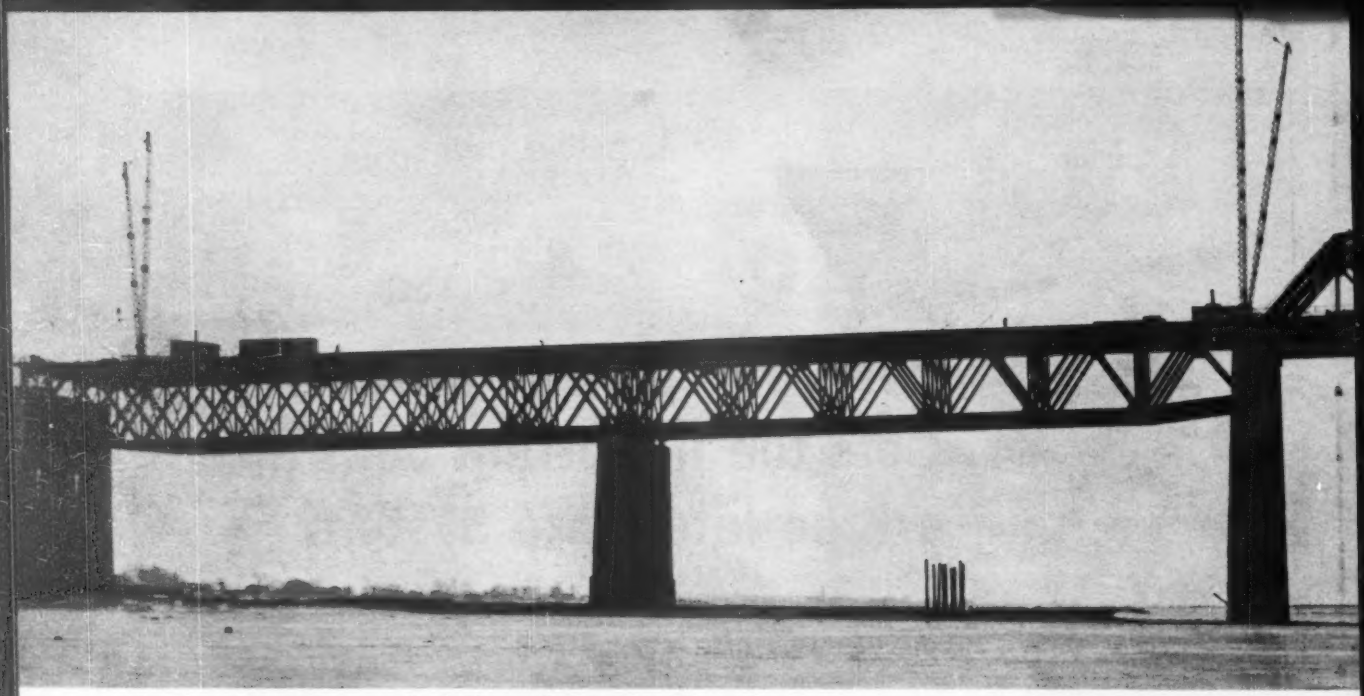
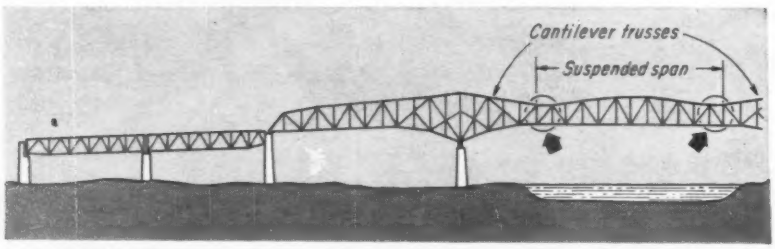
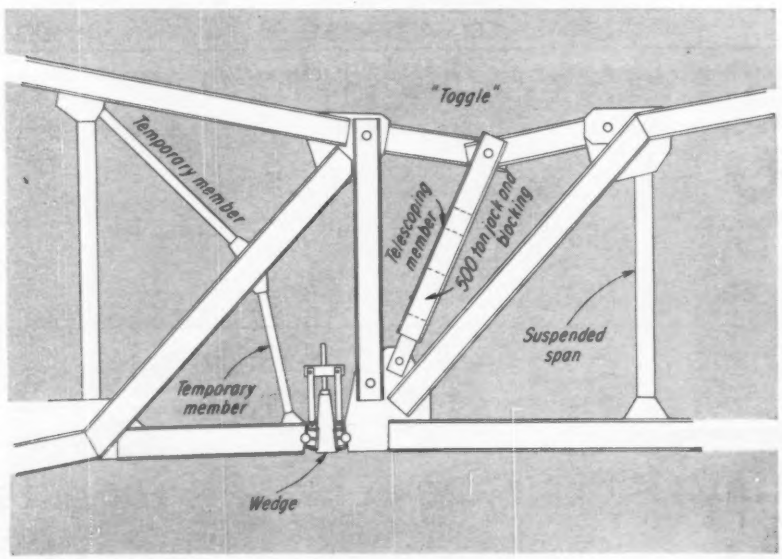


Anchor arm at east end of Champlain Bridge's steel superstructure reaches toward center of

# Toggles and Wedges Ease Span




**SUPERSTRUCTURE** has cantilevered suspended span that fits together at center. Toggles and wedges at circles will insure a perfect fit.




**DETAIL** of wedge and toggle mechanism that will enable workmen to compensate for upward camber in steelwork when final closure is made.

When the two sections of the suspended span on Montreal's Champlain Bridge meet over the St. Lawrence Seaway, workmen will fit them together with a system of wedges and toggles.

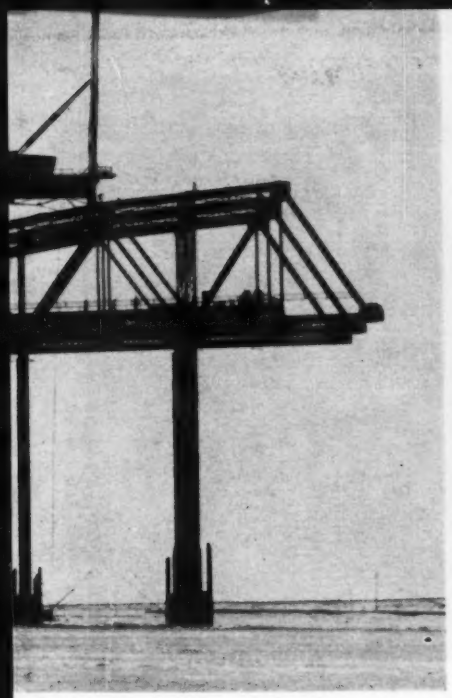
The toggles are jacknifing structural members activated by 500-ton capacity hydraulic jacks. These are paired with hand cranked wedges first used in a similar closure on the nearby Jacques Cartier Bridge, approximately thirty years ago.

The Champlain Bridge, which crosses the Seaway between the St. Lambert and the Cote St. Catherine Locks, incorporates nearly two miles of prestressed concrete (ENR Feb. 16, p. 44).

Steel superstructure of the bridge starts with two 250-ft simple truss spans on each side. Anchor arms 385 ft long reach out from the simple trusses and connect to 160 ft-long cantilever trusses. These, plus the 385-ft suspended truss, make up the 706-ft high level span over the main channel of the Seaway. Over-all length of the steel superstructure is 2,485 ft.

Because the steelwork in the high level crossing will be erected with an upward camber to compensate for sag, the bottom chords of the suspended span will overlap at the center and a gap will be left between the top chords.

To adjust the overlap, the wedges will be installed between the bottom chords of each cantilever arm and the suspended span. Initially, they will help support the center span steelwork



St. Lawrence Seaway where . . .

# Closure

as it is built out from each end. In the closing operation, workmen will lower the wedges to draw the center truss bottom chords apart.

As the bottom chord overlap is reduced, the gap between the top chords will change. On the Jacques Cartier Bridge, workmen cranked up wedges to close this gap. But the Champlain bridge has a three truss center span that would require twelve wedges, and only eight wedges were left over from the two-truss Cartier bridge.

Rather than make the four extra wedges, the contractor, Canada's Dominion Bridge Co., developed the toggles to push the top chords together.

One team of workmen extending the jacks as another team lowers the wedges will jockey the two center trusses into a flush center fit.

The center span closing is not the only operation in which the jacks are cutting costs and time. In building the four 250-ft simple truss spans, workmen jacked up steelwork as erection progressed to relieve loads on temporary supporting bents. This cut the required number of bents to two, which were advanced one past the other as they were needed. The same procedure will be used in erecting the two 385-ft anchor arms. In addition, hydraulic jacks, anchored to the approach piers and connected to the anchor arms, will be used to adjust the anchor arms longitudinally when they are landed against the main piers.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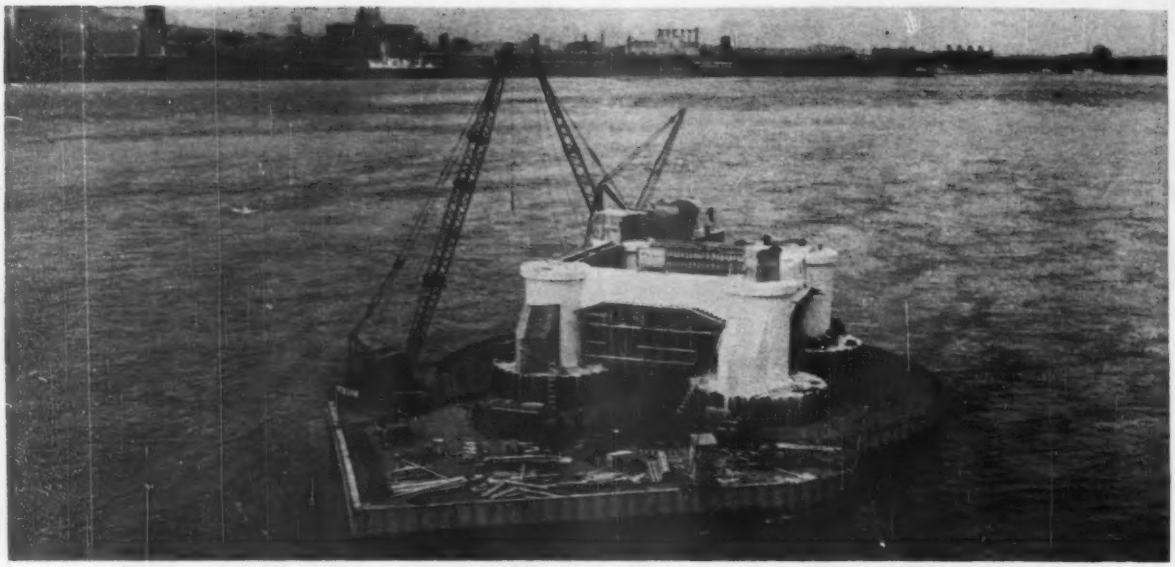
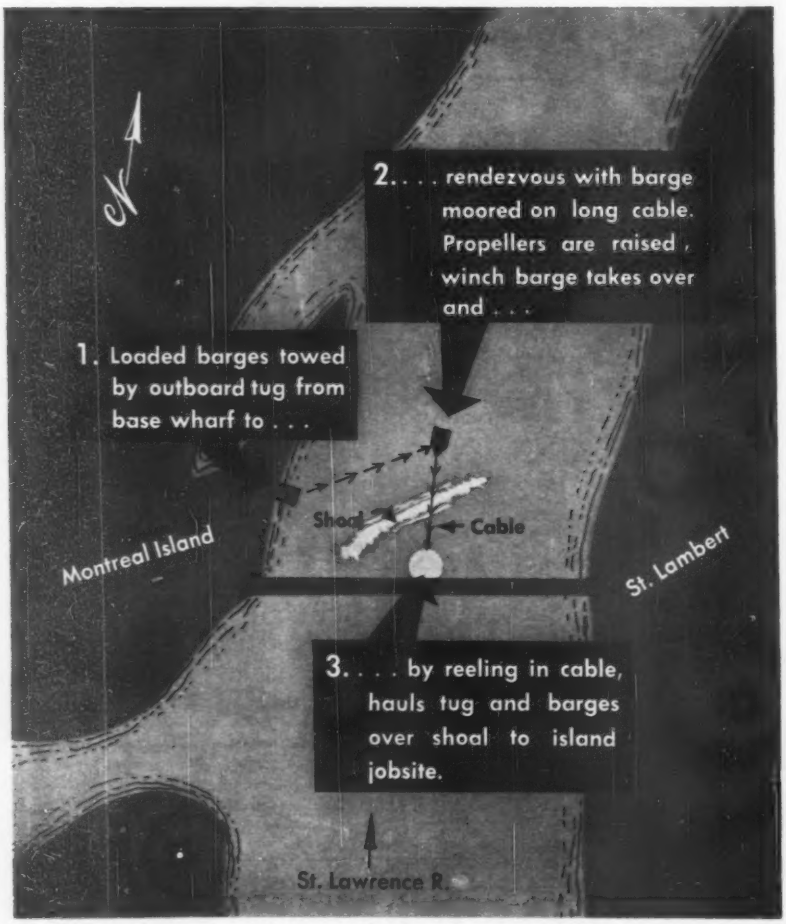


**Island had to be created in St. Lawrence River to build foundation for transmission tower.**

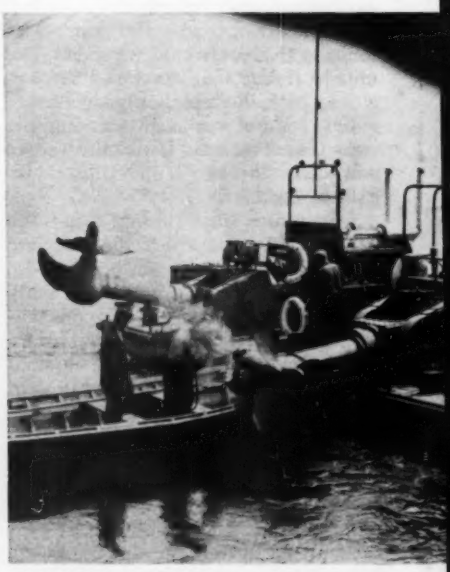
# St. Lawrence Gave Island Makers


2. . . . rendezvous with barge moored on long cable. Propellers are raised, winch barge takes over and . . .
1. Loaded barges towed by outboard tug from base wharf to . . .
Shoal
Cable
Montreal Island
St. Lambert
3. . . . by reeling in cable, hauls tug and barges over shoal to island jobsite.
St. Lawrence R.

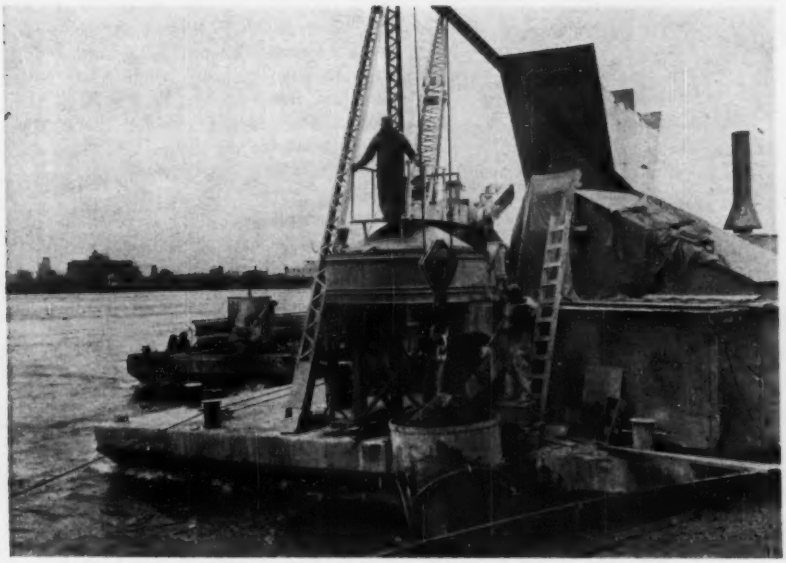
**INDIRECT ROUTE** to island site was necessary because of shoal in river.

All waterborne construction is risky business, but working midstream in the St. Lawrence River's 15-ft per sec current can be downright perilous.

A contractor building a transmission-tower foundation in the St. Lawrence at Montreal for the Quebec Hydro-Electric Commission had to work under these conditions and came through with flying colors. Besides the fast water, Dufresne Engineering Ltd. had a major access problem. Studies of the river's currents and bottom contours revealed a 9-ft channel running



**BATTERED PROPS** on outboards were



**Everything, including batch plant, had to make tricky voyage.**

# a Rough Time

4,000 ft directly downstream to within about 3,000 ft of the tower site.

But at this point a ridge of high bottom, only 3 ft below the surface had to be crossed to get into the upstream channel. The contractor was faced with ferrying all equipment and materials including a complete concrete batch plant over this hazardous watercourse.

The tower site was just downstream and near the center of the 8,000-ft Victoria Bridge. Dufresne decided to establish a base wharf on Montreal Island downstream of the bridge, but a straight-line route to the site was deemed impossible.

The big problem: How to cross the high ridge with heavily-loaded barges. After much trial and error Dufresne hit on a clever solution: a winch-operated barge.

The contractor equipped a 20x50-ft barge with an air compressor, an air-operated hoist and double-drum winch. A 6,000-lb anchor located near a bridge pier served as a mooring for the shuttle barge. The winch barge's pickup point was 3,000 ft downstream of the site.

At this point, barges ferried by a homemade tugboat rendezvoused with the shuttle barge, which in turn winched the whole convoy over the ridge to the job site.

The tug was made up of two 16x32-ft, flat bottomed steel barges, and powered by two 320-hp diesel outboards.

The two 10-ton power units were used because of their retractable propellers, which work almost like the conventional sportman's outboard motor. Two main differences are that these big units have 5-ft-dia props and the shear pins in the drive shafts are located at the upper end of the shaft—an important feature, since hundreds of pins, ⅜-in. bolts, were replaced on this job.

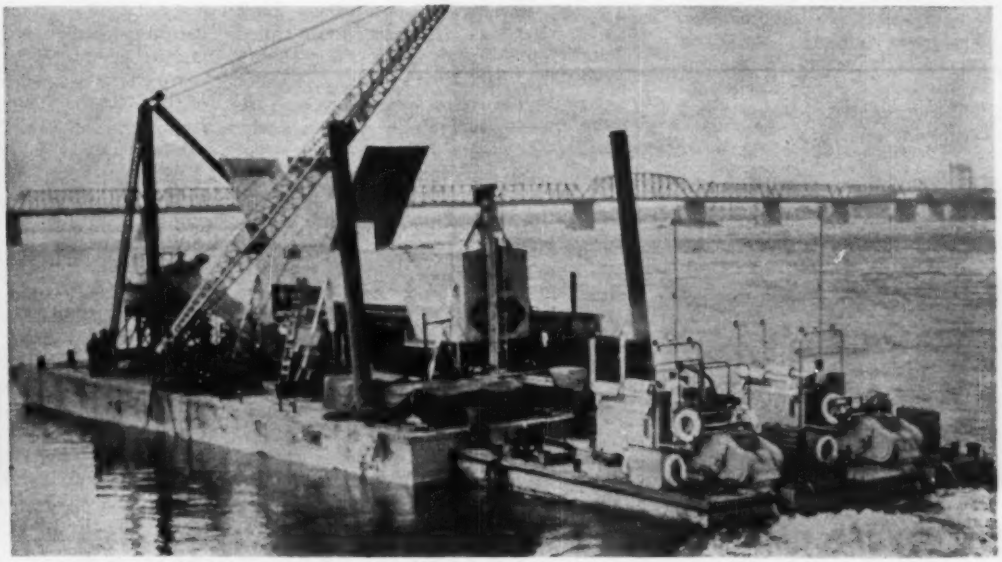
With an eye towards the rough work ahead the contractor bought six propellers for his tug. His foresight paid off—throughout the job two were in use, two in reserve, and the other two constantly in the shop for repairs.

Once this circuitous access to the job had been thoroughly tested and established it was used throughout the construction of the tower.

Barges loaded by a stiff-leg derrick at the base wharf were pushed by the tug to the winch barge, and propellers lifted out of the water. Then the winch barge hauled the loaded barges, the tug, and itself across the ridge. Once "over the hump" the tug's screws were put back into use to assist in bucking the 7-knot current.

On return voyages the winch barge guided the empty barges and tug downstream over the ridge and remained on station for the next trip.

*(Please turn the page)*



constant headache. **CONCRETE PLANT** begins treacherous 8,000-ft voyage that took 1½ hours. Victoria Bridge is in background.

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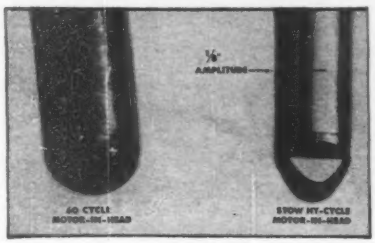


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**TALL TOWER** rises 280 ft above tiny concrete island near Montreal (background).

• **First stage construction**—The first piece of equipment taken to the site was a 45-ton crane aboard a 30x50-ft barge. This unit, anchored in 13 ft of water by spuds, served as the operational base from which to locate the exact center of the tower, establish direction of flow, and then drive four H-piles.

Next step was the construction of a breakwater to provide quiet water for building four 26-ft-dia coffer cells and a 107-ft-dia cell surrounding the four. The small cells would serve as foundations for the tower itself.

The V-shaped breakwater was built of seven 16x16-ft timber cribs filled with run-of-quarry stone. The timber cribs were faced with ⅜-in. steel sheet piling. The cribs were fabricated on the work platform in two sections, bolted together, and sunk into position. Cribs were anchored by H-piles.

• **Cell construction**—After the breakwater was completed, the four smaller cells were started. Precast concrete templates were used, each weighing eight tons and made up of three sections. H-beams were driven and work platforms built for each cell.

One concrete template was suspended 3 ft from river-bottom and a second at water level, roughly 15 ft above the lower ring. Steel sheetpiling then was driven around the rings down about 1 ft into shale.

Simultaneously, using the small cell's work platforms for support, the contractor placed the wooden templates and supports for the main 107-ft-dia cell and drove 30-ft-long sheetpiles to rock to form the circular island.

The large cell was then filled with crushed stone to within 2.5 ft of the top. The 45-ton crawler crane was then grounded on the cell.

• **Foundation cell preparation** – The four foundation cells were next dewatered and excavated to rock mostly by hand. Spoil was dumped in the river by clam shell.

The 26-ft-dia cells were then filled with reinforced concrete. Concrete was supplied by a barge-mounted batch plant which probably presented the biggest headache when it was moved into position.

By the time concreting was started, the contractor had had more than a fair share of sea-going adventures. Projecting rock in the fast-moving stream had twice snapped driveshafts and once the entire steering mechanism of a diesel had been sheared off. Vessels had almost drifted into the regular shipping channel on several occasions.

A 40x90-ft barge was used for the concrete plant, which included a complete batch plant, a 1½-cu yd turbine mixer, an emergency diesel generator, a steam boiler, and a 15-ton stiff-leg derrick. This floating plant made the 8,000-ft voyage from the base wharf without incident, but the trip took 1½ hours.

• **Concreting**—The batch plant's stiff-leg filled the aggregate bins from barges and the plant had a 17-ton cement silo. A 2-cu-yd bucket placed a 1½-cu-yd batch every four minutes. Monoliths were cast in 12-ft lifts with each cell averaging 600 cu yd.

Four columns 20 ft high rise above the cells and were tied together by four cast-in-place cross beams. The two upstream columns were protected by sharp-edged ice deflectors cast as part of the column. These deflectors, called starlings, extend 6 ft 9 in. from the columns and are 13 ft high.

All exposed concrete was sprayed with white curing compound. Sheetpiling was sandblasted and painted with lead chromate primer and two coats of aluminum paint.

The finished island is 4 ft 8 in. above low water, and the last foot is a reinforced concrete slab. The foundation cells rise another 5 ft above the main island and are topped with the columns. The 280-ft steel transmission tower is anchored to the columns by 2½-in. anchor bolts, 10 ft long, embedded in the concrete. Four bolts hold each leg.

Steel for the tower was ferried over the same treacherous water route and was erected from the artificial island.

This "C" Tandem loaded 36 yards of pre-ripped clay in only 40 to 55 seconds with a 191-hp "push" . . . kept pace with single scrapers on same job, climbed same 18% grades, used only 13 more gallons of fuel per *shift*.

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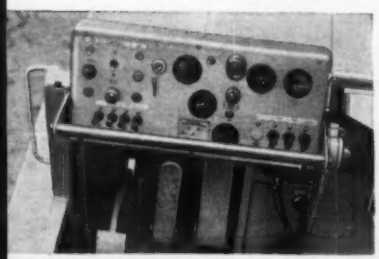
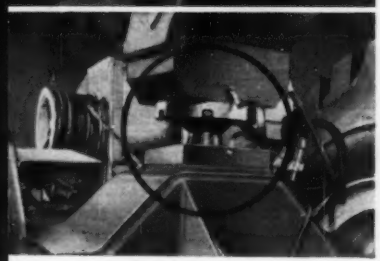


Left row of fingertip switches controls apron, bowl-lift and tailgate of rear scraper; right row controls front scraper. LW "electrics" send power to point-of-work *instantly*.

Connecting rear scraper is a snap! Electric and air line plugs insert readily into quick-disconnect jacks at front-scraper hitch. Only takes a few minutes to do it.



Universal-swivel hitch gives single-scraper maneuverability to turn, back-up with no jackknifing . . . makes 180° tandem-turn in area only 20 to 25% wider than with single scrapers.

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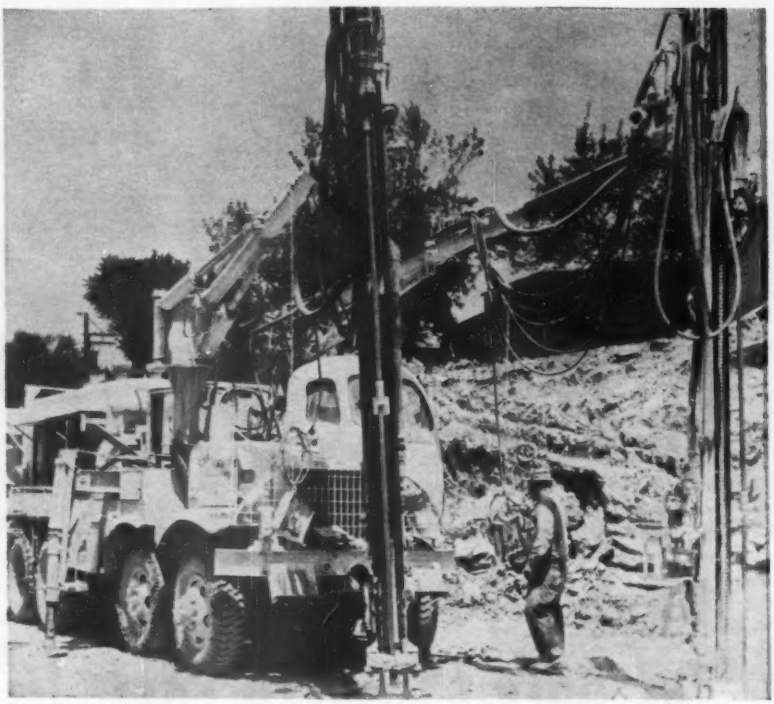

While jumbo stays put, swivel booms spot drills at many locations.

# Home-Made Jumbo Speeds Drilling

An Illinois blasting contractor claims that his home-made drill jumbo is paying dividends on jobs where space is tight and the holes are close together. The firm uses the rig alone for nearly all its close-quarter work on rough ground.

The machine is a mobile, two-boom, hydraulic drift rig made up of standard rock drill components on the chassis of an Army surplus 6x6 truck. The owner-builder of the apparatus, Explosives Engineering Service, specializes in blasting for road construction, quarrying, demolition, etc., within a 150-mile radius of company headquarters in Dixon, Ill.

Where the truck's cab used to be, two hydraulically operated booms are mounted side by side on a steel deck. A new steel cab was installed over the left hood and fender area. The booms are connected to chain feed drifters. Compressed air is supplied by a 965-cfm rotary compressor powered by a 365-hp diesel engine. The power complex is mounted over the tandem rear axles.

Two hydraulically adjusted outriggers are designed to provide additional stability when the drill rigs are working beside the truck.

The jumbo is designed for jobs requiring 2-in.- to 3½-in.-dia holes at any angle. It can sink vertical holes on ledges 10 ft above the truck or in trenches 15 ft below the wheels. And it can drill horizontal holes 18 ft above ground.

The booms have a maximum horizontal reach of 16 ft. Each can swing through three-quarters of a full circle, which permits overlapping. Steel changes up to 24 ft can be handled by extending the drifter masts.

The reach simplifies drilling on rough ground where a rig is hard to move around, according to William J. Small, who designed the jumbo and operates the blasting firm. He says a 50-hole shot on average spacings can be drilled in only three moves.

Three men run the rig—a compressor operator and a man for each drifter. Each drifter mast has a portable control box suspended beneath it for use by the man attending the drill. There is a master control box in the truck cab and an auxiliary control box under each boom table.

The company claims the crew can drill 1,500 ft a day while working under normal conditions or about 125 holes 12 ft deep.

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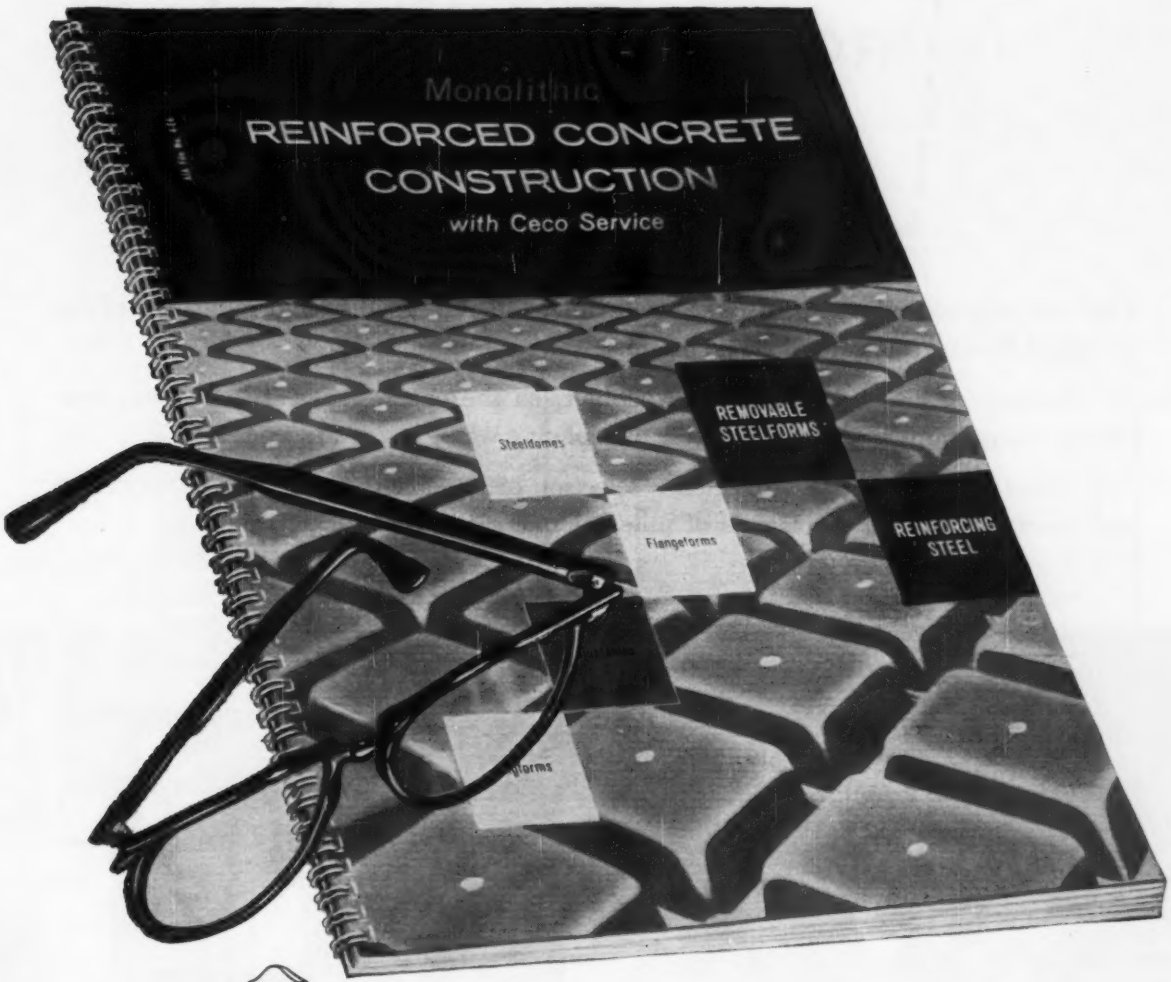


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# Concrete outlasts

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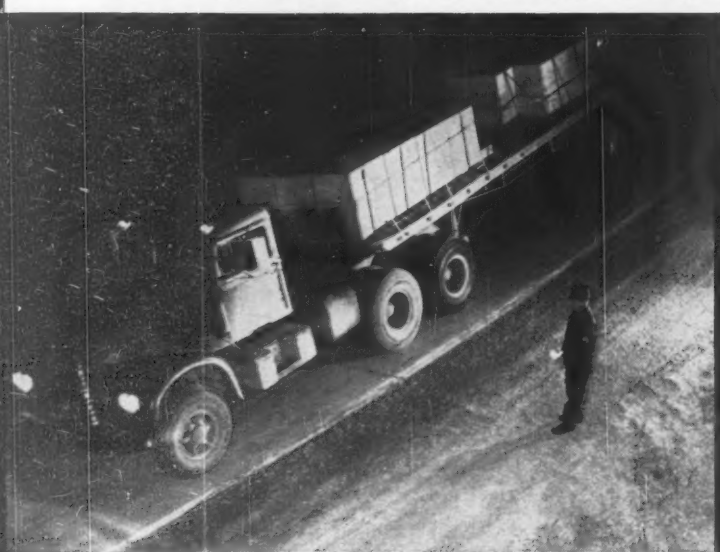
These vital findings will influence selection of pavement type—as well as design and construction—for thousands of miles of roads and streets.

**Conducted under the auspices of the American Association of State Highway Officials, by the Highway Research Board.*



**Day and night for 2 full years,** concrete and asphalt test sections were subjected to the same traffic under identical conditions. 1,113,762 load applications were recorded.

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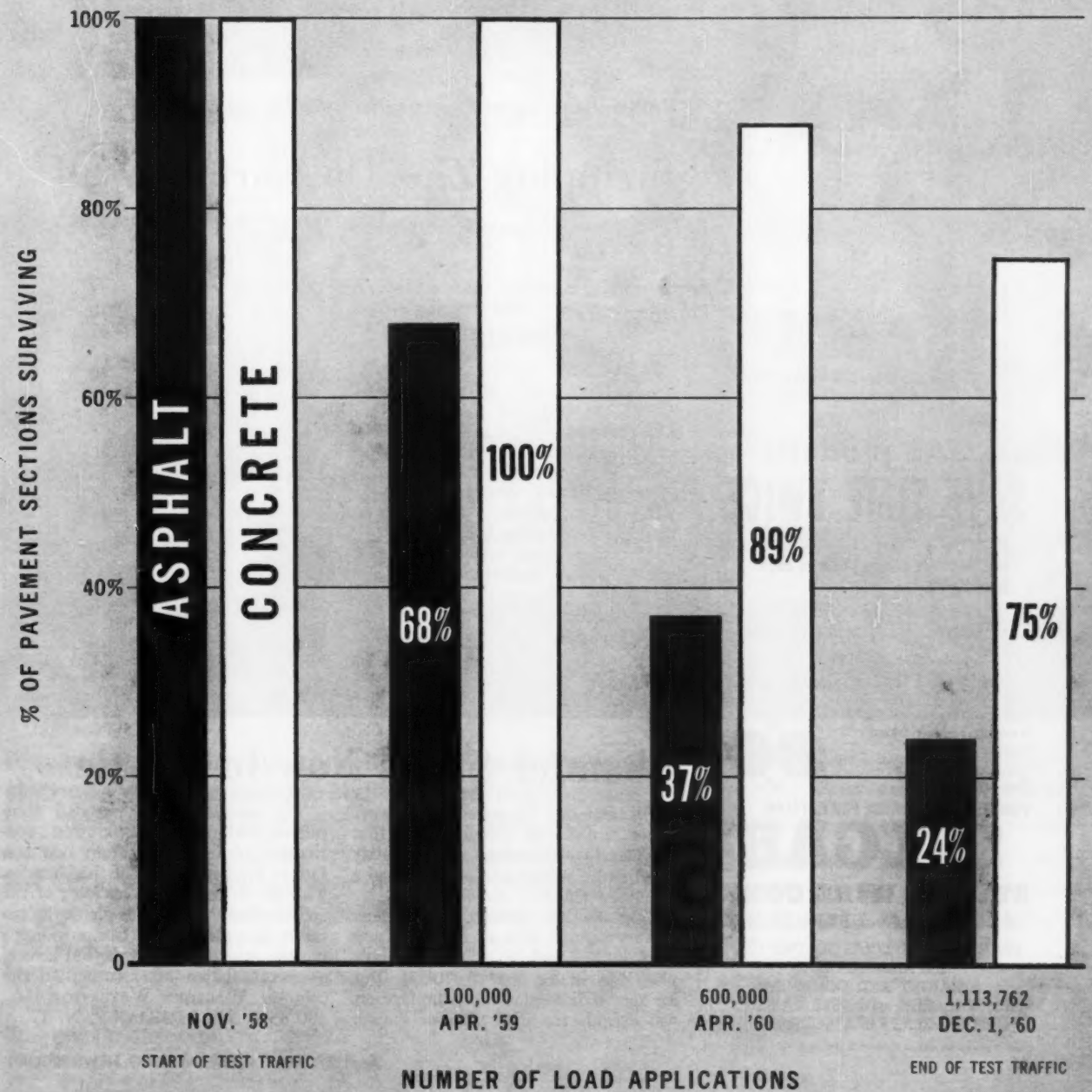
*A national organization to improve and extend the uses of concrete*

# asphalt 3 to 1

How **CONCRETE** pavement sections outlasted asphalt in 2-year test



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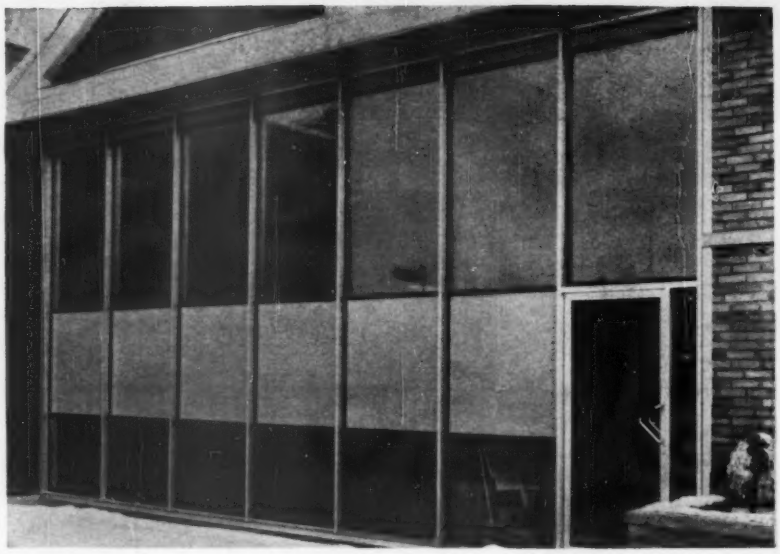


Curtain-wall system is easy to install because . . .

# Stripping Zips Up Curtain Wall

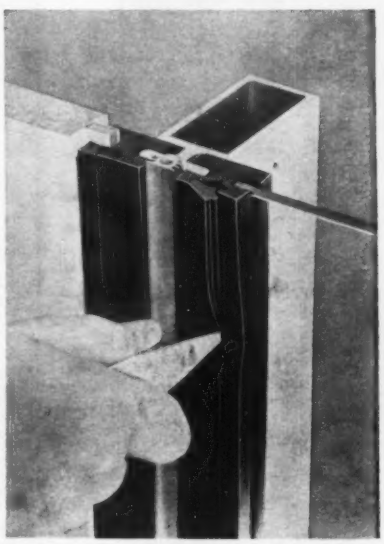
An H-shaped neoprene weatherstrip fits into Zipperwall, a prefabricated curtain-wall system of aluminum mullions and infill components, and literally seals it with a zip. The stripping reduces installation costs 20 to 25%, the manufacturer claims.

Zipperwall's gasket slips easily around the edges of mullions and panels and is locked in place with a tool developed by the manufacturer. It can be unlocked when replacement of panels, glass or windows is necessary.

The stripping fits ¼-in. glass or flanged 1-in. panels. (Stripping for double glazing is being developed.)

The Zipperwall system eliminates moisture and condensation problems, since there is no metal-to-glass contact and the gasket is leakproof.

Other features of Zipperwall are fast assembly, heat-saving and easy installation. KAWNEER CO., 1105 FRONT STREET, NILES, MICH.



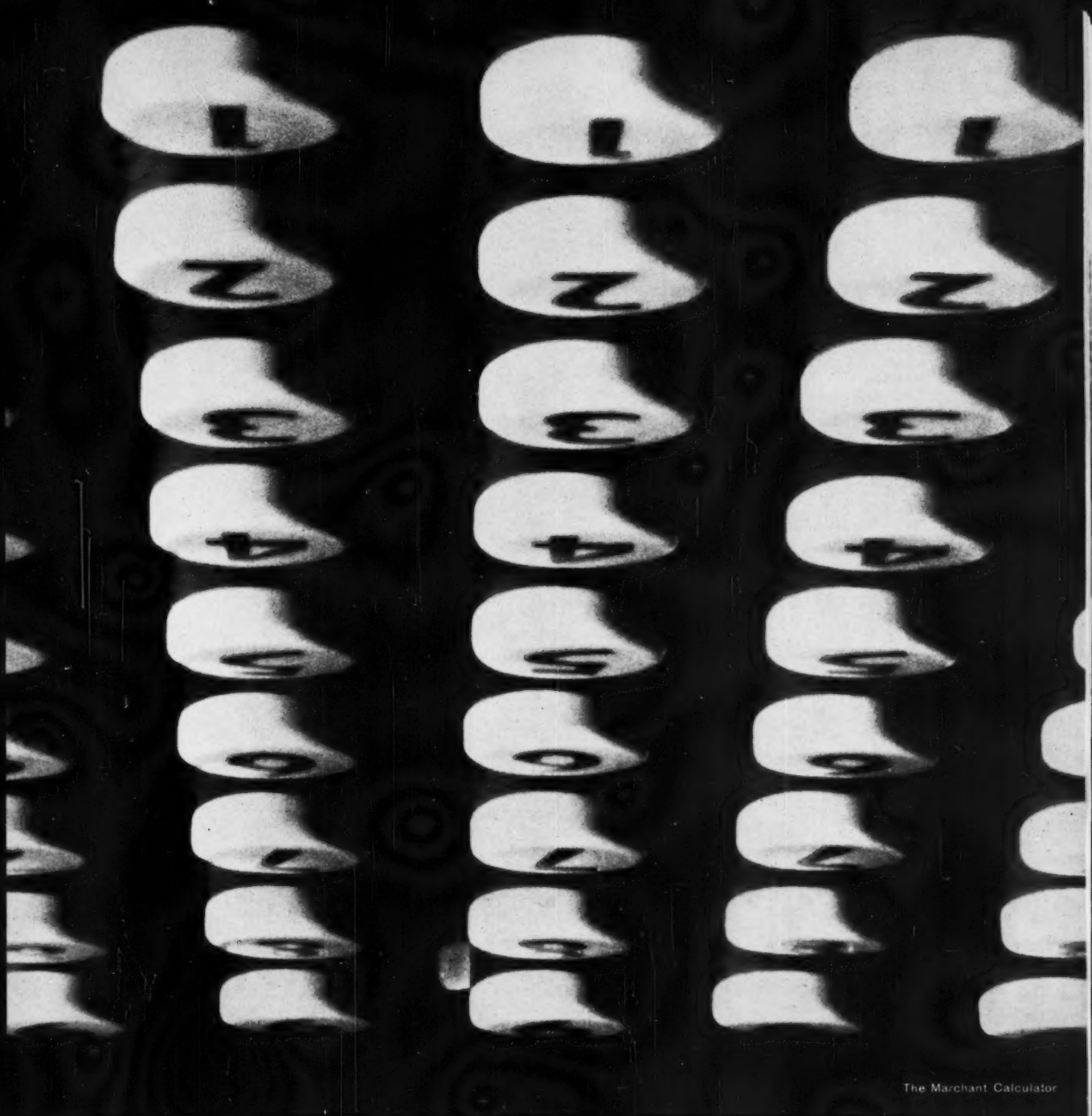
Neoprene gasket seals with a zip.

# Chamfer Strips Now in Plastic

Chamfer strip for concrete formwork is now available in extruded plastic that provides two advantages over ordinary wood strips: a high rate of re-use and a variety of flaw-free corner shapes.

Four standard sections of Ekonomy-Former chamfer strip are available from stock in ¾, 1 and 1½ in. radius rounds plus a 1½ in.-leg, flat face bevel. But for special situations the manufacturer will extrude modified chamfer shapes.

The plastic strips, extruded from polyvinylchloride, have a thin continuous tab extending from one rear face at the back corner of the chamfer. This fits in the corner lap joint of the column form. Form nails pierce the tab rather than the chamfer face providing a positive grip on the chamfer but leaving a smooth, blemish-free corner on the column. WALJOHN WATERSTOP INC., 400 88TH ST., BROOKLYN 9, N. Y.

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PHOTOGRAPH BY PAUL WELLER

# Montana Contractor carves US-89 in the Belt Mountains with JOY Drill and Compressor Team

Working at high altitudes in hilly, broken ground is a tough job for any drill and compressor team. McLaughlin, Inc., Great Falls, Montana is excavating 170,000 yards of rock along US Highway 89 on "Kings Hill" near Niehart, Montana. The job calls for extreme mobility and versatile equipment. The material is quartzite, and is badly broken with many seams. The Joy TDM Trac Drill with 450-DR Dual Rotation drill is averaging up to 390 feet of three inch hole per eight hour day. Working straight through the winter months, the 600 foot Airvane rotary compressor starts on the coldest days and keeps on running. An exclusive thermal by-pass oil system assures adequate lubrication and fast warm-up, even during below zero temperatures.

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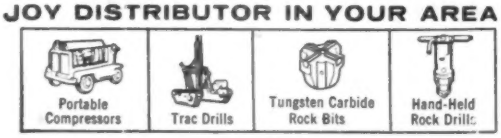

## Ceiling Troffers Provide Light, Heat and Air

Triple Shell Lumi-Flo air-handling, ceiling troffers not only house lamps for lighting but also diffuse cool or warm air.

Suitable for use with any kind of hung ceiling, the units feature an air passageway that is insulated with glass fiber and an air gap. This is intended to eliminate temperature variations that might affect the light output.

Air-handling capacity of the troffer is up to 200 cfm from a single 1x4 or 2x4-ft unit—nearly twice that of conventional units, according to the manufacturer. To clear beams and pipes in the plenum, the units have been designed with a shallow depth of $4\frac{7}{8}$ in. at the ends. BENJAMIN DIVISION, THOMAS INDUSTRIES, INC., 207 E. BROADWAY, LOUISVILLE, KY.

## Roof-mounted Unit Heats and Cools Air

Single package rooftop heating ventilating and air-conditioning unit delivers either $7\frac{1}{2}$ or 10 tons of cooling and from 204,000 to 340,000 Btu of heat.

One thermostat can control both heating and cooling or, if desired, two thermostats may be installed for controlling two different zones.

Louver blades direct the conditioned air, which may be ducted or distributed through a diffusing head that projects below a ceiling surface. The unit also contains a rain filter and a hammock type air filter with an area of 13.7 ft. The cabinet is weather proof galvanized steel with acrylic enamel finish. LENNOX INDUSTRIES, INC., MARSHALLTOWN, IOWA.

## Insulated Interior Panels Added to Building Line

Economical steel buildings are the rule with the redesigned Armco steel building line. Insulated snap-in panels for interior finishing are now available for all models of the line, together with a variety of roof designs.

Both a 2-12 pitch table roof or conventional 4-12 pitch roof are available. Building spans from Armco components are possible up to 120 ft with a range of 18 widths starting at 5 ft 4 in. Building height variations are available from 8 to 40 ft.

A choice of four framing systems provide a wide variety of design combinations for industrial, commercial and public buildings. ARMCO DRAINAGE AND METAL PRODUCTS, INC., 9460 CURTIS ST., MIDDLETOWN, OHIO.

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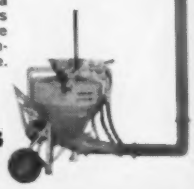

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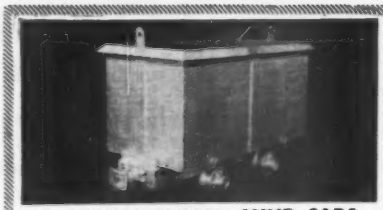

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## New Product Briefs

• **Pneumatic roller**—A nine wheel pneumatic-tired roller, called the PR-11, has a capacity of four to eleven tons and will compact surfaces at more than 90 lb per sq. in. according to the manufacturer. Other features are: all wheel oscillation, six ply tires and a 152 gal. sprinkler tank. AUSTIN WESTERN DIV., BALDWIN LIMA HAMILTON CORP., PHILA., PA.

• **Portable primary crushers**—Cedarapids models number 4336 and 3026 single impeller impact breakers. Capacities of 200-400 tph and 150-250 tph respectively. In both units, material is initially reduced by whirling impellers. A secondary reduction is achieved when the material is thrown against a breaker plate and a breaker bar. IOWA MFG. CO., CEDAR RAPIDS, IOWA.

• **Fast-heating boiler**—The Model 231 boiler can reach operating temperature in 15 seconds because of a ceramic fiber combustion chamber. According to the manufacturer, the oil-fired unit is also 45 lb lighter than previous models and, with contoured vanes and thermal pins in the boiler, achieves a 50% higher rating in heating absorption capability. BRYANT MFG. CO., 2020 MONTCALM ST., INDIANAPOLIS, IND.

• **Climbing crane**—Six models of the Schwing climbing crane to lift up to 3,100 lb at a maximum radius of 98 ft. At 45 ft or less, the cranes lift 6,200 lb. All models can be operated from a remote control box. Boom and jib can be carried on a climbing mast set within a structure or, in the absence of interior support, from a mast set up outside a structure. VIBRO-PLUS PRODUCTS, INC., STANHOPE, N. J.

• **One step metal cleaner**—Turco W. O. No. 1 cleans and removes rust from metal in one step. According to the manufacturer, the cleaner can be brushed or sprayed on to machinery in the field without disassembly of the equipment. A slightly porous surface, which absorbs primer and provides a firm base for paint, is left by the cleaner. TURCO PRODUCTS, INC., 24600 SOUTH MAIN ST., WILMINGTON, CALIF.

• **Curbing machine**—High curbs of either asphalt or portland cement concrete placed at the rate of 3 to 5 ft. per minute with Power Curbers Model 700. Machine adjusts for grades and for a turn radius as low as 12 ft. Maximum curb height 24 in. POWER CURBERS INC., SALISBURY, N. C.

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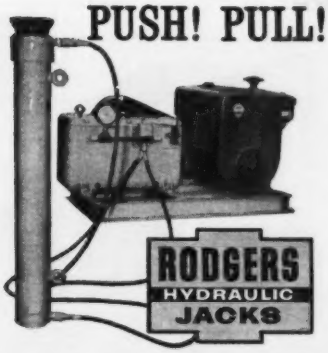


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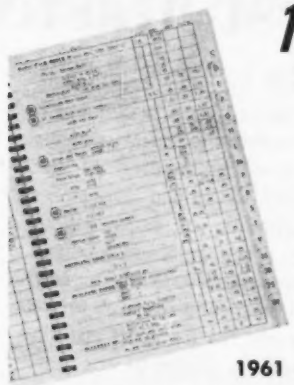

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## . . . New Product Briefs

• **Roof resurfacer**—Stonshield is brush or spray applied to composition, concrete, gravel, and metal roofs. The compound is a combination of fibrous and non fibrous mineral pigmentation and is said to protect roofs from cracks, tears and loose nails. STONHARD CO., INC., 401 NORTH BROAD ST., PHILADELPHIA, PA.

• **Vibrating screens**—Fully enclosed vibrating screens for hot mix asphalt plants, quarries, and cement plants where extremely dusty conditions are prevalent. Panels are heavy gage steel but arranged for easy removal. DEISTER MACHINE CO., 1933 EAST WAYNE STREET, FORT WAYNE 4, INDIANA.

• **Aluminum-shingles**—Regent shingles come in lengths 10 ft. long and 12 in. wide for easy installation. Free from rust, rot, curling and warping, the shingles are made to interlock for a permanent roof. Other advantages claimed by the manufacturer are: light weight, reduced insurance rates and lower heating and airconditioning costs. CONSOLIDATED GENERAL PRODUCTS, INC., HOUSTON, TEX.

• **Sheepsfoot roller**—The Road Runner Wedgefoot, Model FDB120, a yoke—tongue roller that can be towed by a John Deere 840 or a Caterpillar DW10 tractor. Has an empty weight of 12,650 lb and dual rollers each 4 ft in diameter and 5 ft in length. AMERICAN STEEL WORKS, 1211 WEST 27TH STREET, KANSAS CITY, MO.

• **Plastic floor patch**—Magic-Floor can be rolled flat with a wide track fork lift. It is claimed that heavy duty industrial floors of concrete, wood, wood block, brick and steel can be patched in minutes and open to traffic immediately. RANCO INDUSTRIAL PRODUCTS, 13311 UNION AVE., CLEVELAND, OHIO.

• **Self-propelled crane**—A rubber tired, 35-ton crane requires a one man crew and features independency of all machine operations. Crane is mounted on a 4 axle, 8 x 4 drive carrier with power steering, brakes and shift and a 33 ft turning radius. LINK-BELT SPEEDER CORP., CEDAR RAPIDS, IOWA.

• **Glass doors**—Tempered, rough plate-glass doors, an addition to the Tuf-flex line, are available in ½-in. thickness in three styles. They have a translucent textured appearance featuring light transmission as well as privacy. LIBBEY-OWENS-FORD GLASS CO., 811 MADISON AVE., TOLEDO 1, OHIO.


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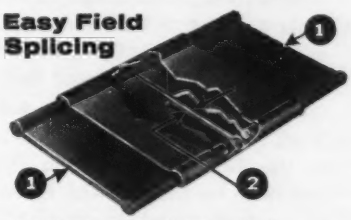


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**Quick field splicing method:** Waterstop ends are cut square. Approximately 3" on both sides of each end of the waterstops are coated with EC 1300 cement. The Union is slipped over one end and pushed until the end meets the center web. The other waterstop end is inserted and pushed to the web.

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Nervi comes to lecture . . .

to look at the building he has designed with engineers . . .

# Ferro Cemento's Modest Master

This month, Pier Luigi Nervi flew in from Rome to make a speech at MIT and to check up on his interests in the U. S.—some old and one new.

One older Nervi interest here is his intricate concrete roof now being constructed for the Port of New York Authority Bus Terminal at the Manhattan end of the George Washington Bridge. He spent an afternoon on the job with Chief Engineer John Kyle of the Port Authority, hearing the contractor's questions, discussing his design with Port Authority engineers.

The newer Nervi interest took most of another day of his busy week in the U. S. He visited the Syosett, N. Y., office of Lockwood, Kessler & Bartlett, Inc., and thereby made known that he and this imaginative consulting firm have laid the groundwork for collaboration on projects in the U. S. that would make full use of the Nervi genius and the special instrumentation developed by LKB for advanced design.

Specifically, Professor Nervi and his new collaborators here are interested in applying to a few projects of unusual nature the unique combination of the electronic methods LKB has developed for stress analysis and the Nervi technique of using model testing for advanced design. The Portland Cement Association is following these developments closely and is cooperating with LKB on special research problems involving model testing and the use of electronic methods of stress analysis for the design of concrete structures.

Modest to the point of shyness, Pier Luigi Nervi slipped in and out of the country quietly, attending to his work. His work, of course, is renowned the world over. But what of the man himself? In the story that follows, ENR's Rome correspondent draws a profile of Italy's "Wizard of Cement."

**By Nino Lo Bello**

NOT since the days of Ancient Rome when Nero played with matches has Italy seen a man who has been able to set The Boot's architecture afire as has Pier Luigi Nervi. Affectionately called the "Wizard of Cement," he is Italy's top-ranking construction engineer.

Many thousands of laymen who flocked to Rome for the 17th quadrennial games were impressed by Professor Nervi's Olympic installations (he fathered the breath-taking Palazzo dello Sport, the smaller but equally magnificent Palazzetto dello Sports and—a discus-throw away—the eye-shattering Flaminio Stadium). Yet few of the visitors were aware of the name of the master who created the poetic concrete that stole some of the limelight from the athletes.

Nothing could have gladdened the heart of Prof. Nervi more than this "blessed anonymity." For unlike most Italians, he suffers from some kind of reverse virus that makes him want to

**and to study the builders' construction problems on the job.**

# Visits U.S.

stay out of the spotlight and to shun publicity in all its forms.

Thus it is that Roman newspapermen sometimes dread interviewing the Wizard of Cement. Although he rarely refuses a request for an interview, mostly because he doesn't like to hurt people's feelings, Professor Nervi just does not cotton to talking about himself. He bats at all questions with monosyllable answers or in economic syntax.

"The press exaggerates. They've been trying to make a hero out of me for reasons I do not understand. I'm an engineer, and I do what I am supposed to do. I build. Why should that be so important to editors?"

In spite of his shyness during press conferences, Pier Nervi loses all his reticence if you pop questions about his profession at him. Just mention the word "concrete" and Nervi warms up like a balmy Mediterranean breeze on a September afternoon.

"The finest construction material that man so far has been able to find," insists the white-haired, 69-year-old, bespectacled engineer. "Concrete will do anything. Apart from its other advantages, concrete has the virtue of economy."

The love affair between the "Professor of Concrete" and his mistress has borne to the field of engineering a most interesting product. Professor Nervi is the inventor of ferro-cemento, a method of building up cement mortar on wire fabric that produces a thin lightweight shell with unusual strength.

Examples of this Nervi concrete technique are to be found mostly in Italy. There's the modern Pirelli Rubber Co. skyscraper in Milan (32 stories), which is Europe's tallest commercial building (ENR Oct. 13, 1960, p. 64), the huge exposition hall in Turin, the umbrella-shaped beach pavillion at Ostia, a ballroom in the shape of a large daisy at the spa of Chianciano, the $2-million Olympic skyway in Rome and many railroad stations, factories and warehouses, as well as last year's Olympic structures. Many of his buildings feature the Y-shaped flying buttress, a sort of Nervi trademark today.

In Paris he has worked alongside Marcel Breuer to design the magnificent UNESCO headquarters auditorium. In New York the first Nervi product will be the roof of the George Washington Bridge bus station, scheduled to be completed by 1962.

Professor Nervi's favorite Olympic building is the Palazzo dello Sport which looks like an unlaunched flying saucer. Situated on a hillside in Rome where Mussolini had planned an international exposition for the year 1942, the concrete and glass palace seating 15,000 served as the site for Olympic boxing and basketball. The dome of this $3-million arena is nearly three times the diameter of the 138-ft dome of St. Peter's Basilica; at its highest point, it is 106 ft above the floor (ENR March 3, 1960, p. 42).

His latest project is currently under way in Turin, Italy's large northern industrial city. It's the Palazzo del Lavoro, a labor headquarters. The building, to be completed in March, is 525 ftx525 ft and 82 ft high. Tapered steel girders, cantilevered radially from concrete columns, also tapered, carry the flat roof.

Besides meeting newsmen, another Nervi peeve is to be called an architect. He admits to proficiency in this field but insists that his formal training and degrees are in the field of civil engineering. Therefore, he insists his title should be "Ingeniere" and not "Architetto".

Professor Nervi stresses this point to his students every semester. He teaches one course a year, two hours a week, at the University of Rome. He lectures with no notes, and despite his advanced years, stands throughout the entire period, leaning sometimes on his lectern. Students report that words come out of him like wet concrete out of a mixer.

Nervi students get a double dose of his philosophy. He feels strongly that the distinction between architecture and engineering is artificial and decries the fact that universities throughout the world still keep the two areas in separate compartments.

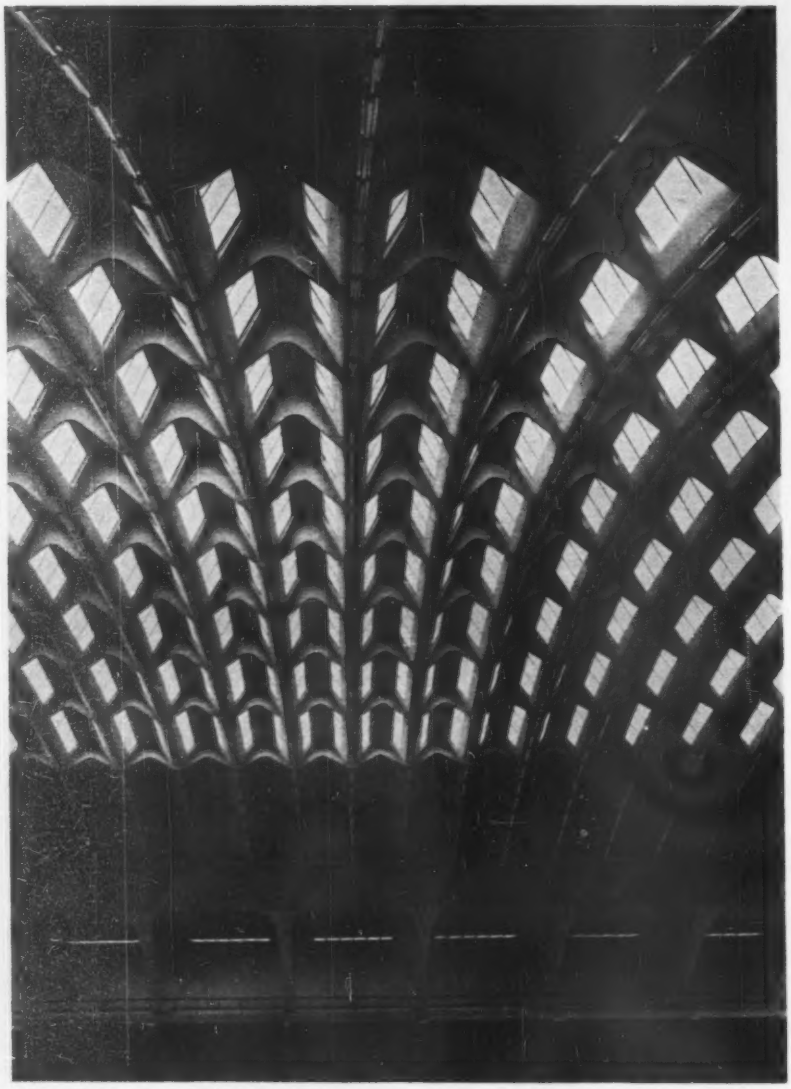
"It is impossible to talk of the two fields as being separate," he adds with a militant quality in his voice. "Until we have schools which teach engineering and architecture as one whole subject and therefore graduate men who are equally proficient in both specialties, we will remain on the high seas."

Nervi is a firm believer that an engineer-architect should also be his own building contractor on the job, a kind of triple-threat man. Nervi himself serves as his own contractor on many projects. He maintains a warehouse full of construction equipment.

He believes the advantages of building his own designs are infinite. While he was building the UNESCO auditorium in Paris, he ripped out some of the columns after deciding that he could get more strength (and beauty) out of a reinforced concrete column.

"Had I not been my own contractor," he points out, "it's unlikely that I would have been able to give the in-

**STRIKING BUTTRESSES,** thin domes are a Nervi trademark. Palazzetto dello Sport in Rome spans 194 ft with a 4¾ in. thick dome.



**NERVI'S FERRO CEMENTO,** sprayed in layers on mesh, started with this roof design.

stallation this added advantage after the design and plans left my office."

He does most of his designs by himself in a small office on a quiet tree-shaded street overlooking the Tiber River. There, a squad of 15 young men work in white coveralls over their drafting boards. He circulates among his worshipping young engineers and architects as a kind of paternal guide, always polite and always with a smile and a gentle word. People who come to visit the office on business are not infrequently greeted by Professor Nervi himself (often in his shirtsleeves). He sometimes acts as his own receptionist or answers the office phone.

Because of such informal ways, he is perhaps the most accessible celebrity on the Italian peninsula. Students from all over feel free to go to his office unannounced, to consult him on term papers or school projects they're engaged on.

At work, Professor Nervi keeps regular, punctual hours. Since he lives in the same building in which he has his office, the professor reports to work at 8:30 every morning, stays till nearly one o'clock before he crosses the hallway to go home for a heavy dinner and a two-hour nap. At four he goes back to his office and usually tarries till 7 or 8 o'clock. Evenings he spends at home, listening to his extensive collection of operatic records, which go heavy on Wagner and Verdi. He admires Wagnerian music because it "appeals to the mind of a mathematician" and he adores Verdi because "this is music for the heart and soul, so truly Italianissimo."

At one time he and his wife, Irene, were dyed-in-the-wool sailors. He was captivated by the hobby of sailing, possibly because he had to employ mathematical principles to navigate. A few years ago he had to abandon the hobby

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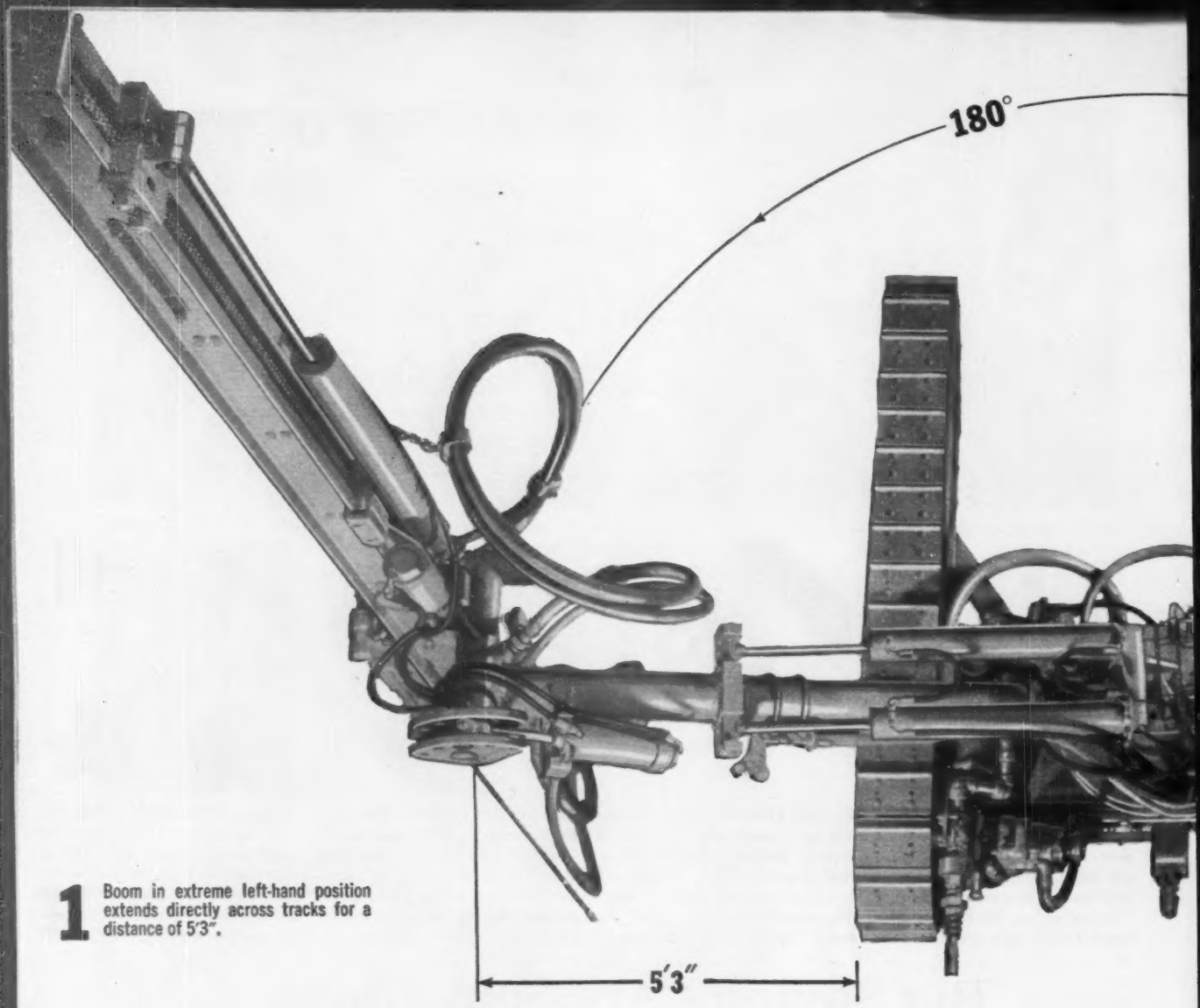


**1** Boom in extreme left-hand position extends directly across tracks for a distance of 5'3".

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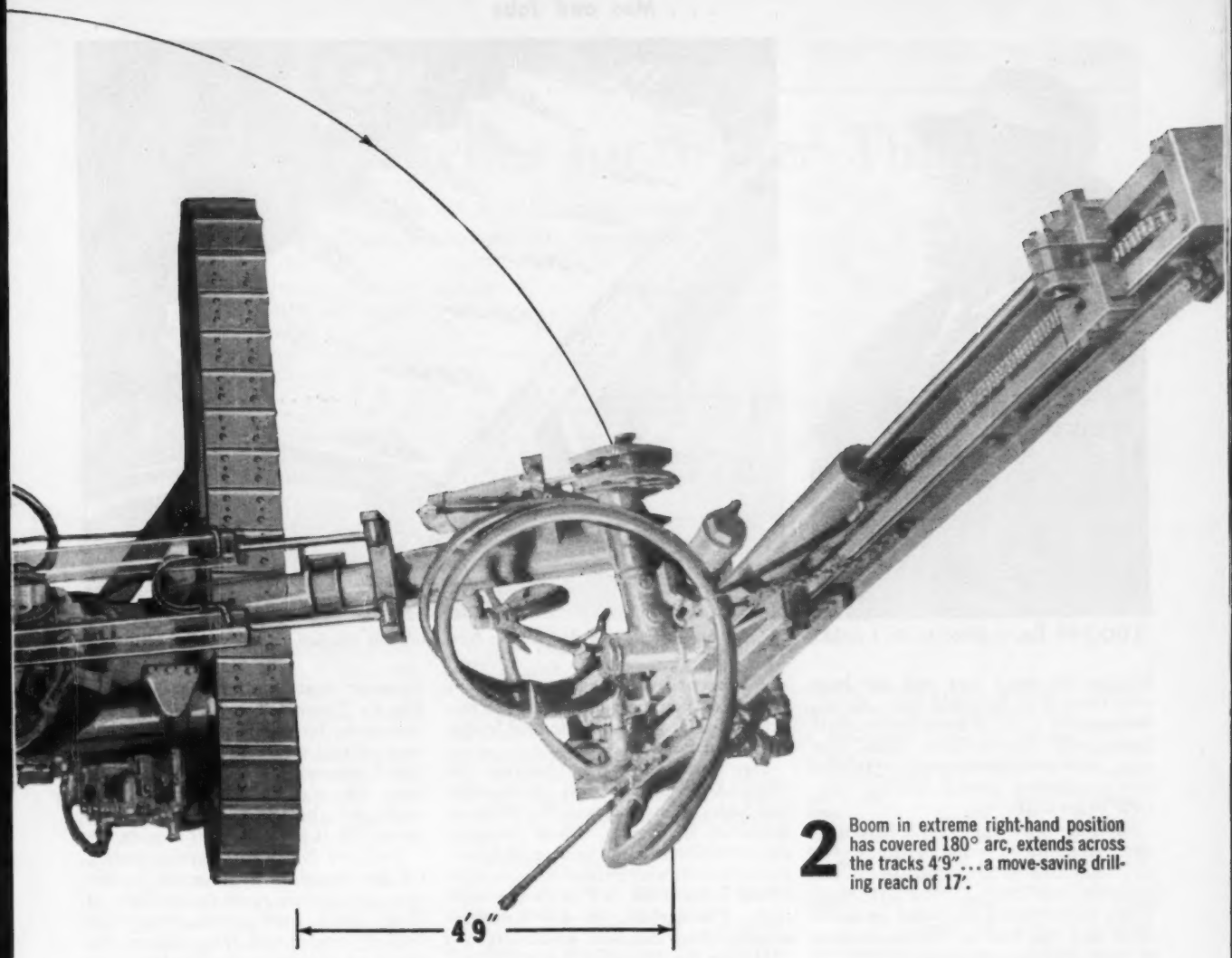
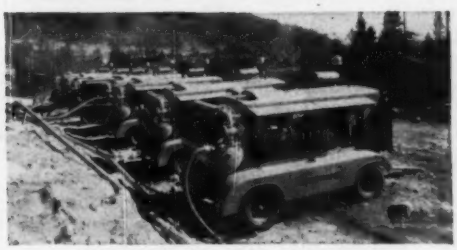
You'll want a copy of Bulletin SP-3267 that includes complete specs, operating diagrams and dimensions on the revolutionary new G-900 Tracdril. Write today to: *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, N. Y.*

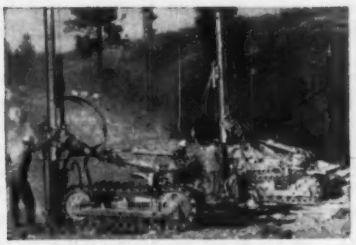
**ROCKY LEDGES,** with sheer drops are common in Donner Pass. Knee-action tracks and fast-acting automatic brakes combine a stable drill mount with driller safety.




**2** Boom in extreme right-hand position has covered 180° arc, extends across the tracks 4'9"... a move-saving drilling reach of 17'.

# HOUSE REACH" PAYS-OFF!





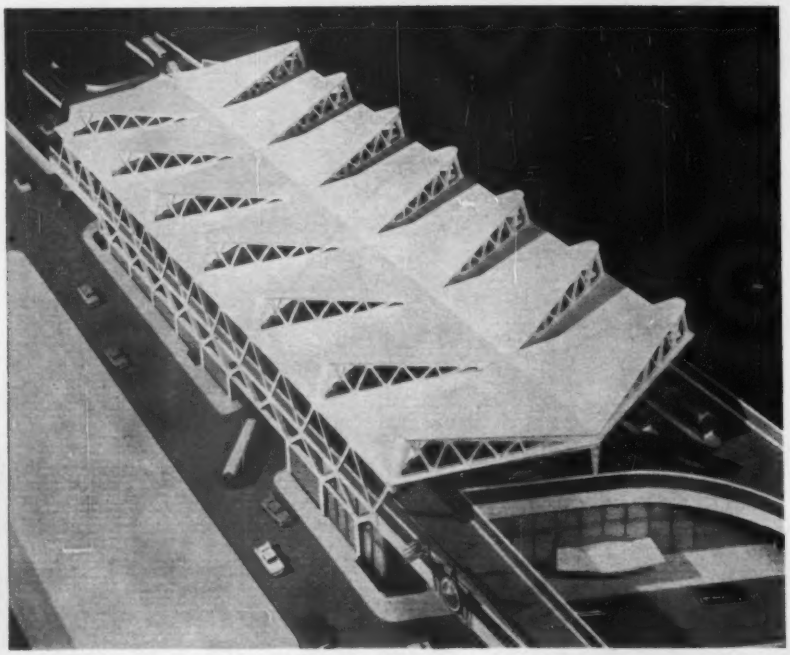
(Left) **BATTERIES** OF CP-600 "Power Vane" Rotaries supply the "Go-Power" to teams of Tracdrils. Feature: easy portability — low maintenance, high altitude operation and "hands-off" dependability.

(Right) **YOU CAN'T ALWAYS PICK** the conditions . . . but you can pick the equipment you know will do the job . . . get the "Boarding House Reach" of a G-900 for your next project . . . it will pay-off for you!

**Chicago Pneumatic** *8 East 44th Street, New York 17, N. Y.*

**PORTABLE AIR COMPRESSORS • PNEUMATIC and ELECTRIC TOOLS • REICHdrills • THREE-CONE AIR-BLAST BITS • ROCK DRILLS**

"I DO what I'm supposed to do; I build"



. . . but his intricate roof design for a New York bus terminal gives a stronger testimony.

because the sun's rays and the heat were more than he could take. Nevertheless, after quitting he built two small boats with ferro-cemento hulls that were only a half-inch thick. He has also constructed several 500-ton concrete cargo boats.

Professor Nervi and his wife have four sons: Antionio, 35, and Vittorio, 31, are both architects; Mario 34, is an engineer, and Carlo, 32, is a physician. Three of the Nervi boys work in dad's office and are held in highest esteem by their colleagues throughout Italy.

The professor visits his projects frequently, buzzing around town in his Fiat 1800 and poking about at the site, sometimes on his hands and knees. He feels that as a "maestro di costruzione" (construction master)—a nickname he likes—he can supply at times "a subtle grain of intuition needed to carry his mathematical calculations towards the practicality of construction."

Pier Luigi Nervi was born on June 21, 1891, in the northern town of Sondrio. Because his father was a postmaster, the family had to live in various parts of The Boot. Young Nervi attended the University of Bologna, where he decided to devote his career to civil engineering.

His first job was as a draftsman for a large Bologna cement company, to which he still attributes his special interest in concrete. During World War I, Nervi held the rank of lieutenant with the Italian engineers. Under combat conditions, he built dozens of pontoon bridges and trenches. After the war he went back to the cement company. For that firm he put up an impressive single-span concrete road bridge outside of Pisa.

He started his own business in 1923. One of the first all-concrete buildings he erected was the Cinema Augusteo in Naples, which brought considerable criticism from contractors and architects who insisted the structure would collapse for lack of proper support. The building is still standing, despite Allied and Nazi bomb hits.

During the Mussolini regime, Nervi limited his talents to building warehouses, docks and other utilitarian projects. In 1940, however, the Government assigned him the job of putting up six huge hangars for the Italian Air Force, each spanning areas of 330 ft by 130 ft.

For the first time he used his own special technique of prefabricating the basic elements—concrete spans reinforced with steel rods. The spans were hoisted into place, the rods were welded and the joints were covered with more concrete. The jointing process brought skepticism from colleagues in the field.

Just before its retreat, the German Army dynamited the gigantic hangars. In the ruins he uncovered some of the controversial joints—intact.

This experience with the hangars reinforced Professor Nervi's faith in his theories. Thus in 1948 when he built the Turin Exhibition Hall, the first building in the world to use ferrocemento, he had no doubts the structure would stand up. The building fraternity kept insisting otherwise. For him the Turin Hall was an entirely new departure, for he aimed at conscious architectural elegance as well as functional engineering. The main salon looks like a mammoth barrel of concrete and glass, thrown across an expense 309 ft long and 240 ft wide.

Professor Nervi has traveled widely. Of the American architecture he has seen, he admires most the wonders of New York's construction, being particularly pleased with the parkways. He speaks of Manhattan architecture with considerable enthusiasm. On the other hand, he talks very critically of his own work. The Milan Fair Building he constructed ten years ago, he feels, should be taken down and done over.

Because of his fame, which has come to him mostly during the last decade, the professor now has to turn down numerous foreign job offers. He likes to keep his projects at six a year. In Italy, however, he still has to bid competitively on jobs, as he always has had to do (nearly all of his work is on public buildings), but his intimate knowledge of concrete and his tri-frontal approach to a given project as engineer-architect-contractor gives him ample leeway in divining his costs.

His economy secret involves "prefabrication," which he insists is really no secret at all. But it involves other things, too—design involved with concurrent construction, careful selection of structural elements to permit economical repetition. Many things combine to total the Nervi genius.

# Finishing Touches for Water Tunnel

## New York City will pay $4.6 million to control and meter flow from Cannonsville Reservoir

The award of two contracts totalling $4,662,972 for the intake and outlet works of the West Delaware water tunnel pushed New York City's Delaware water supply system within an inch of completion.

West Delaware Tunnel and its source, Cannonsville Reservoir, comprise the third and final stage in the Delaware System, one of three huge systems filling the city's water needs; with its completion New York City's water supply will safely yield 1,510 mgd. These two projects are for the Board of Water Supply, City of New York.

Johnson, Drake & Piper, New York City, took the intake works contract for $2,570,993, 4.7% under the second low, The Lane Corp., Meriden, Conn., and 28% under the high of ten. Scoring with excavation prices, Johnson, Drake & Piper bid just $0.50 a cu yd for 320,000 cu yd of earth excavation, and were from $0.15 to $1.82 under the other nine bidders. Similarly, for rock excavation they bid $10.00 a yard for 15,500 cu yd and were low by $0.50 to $26.20.

The joint venture of Rosoff Bros., Inc., & Foster-Newman Contracting Co., Inc., New York City, bid $2,091,980 to take the outlet works contract. The low was 5.1% under Johnson, Drake & Piper, second low, and about 39% below the high of ten bidders.

The intake works will be located at the upstream end of the West Delaware Tunnel on the south side of Cannonsville Reservoir about five miles from the Cannonsville Dam. It will consist of an inlet channel, three intakes at different levels, and the substructure of the intake chamber. The intake chamber superstructure will be built under another contract.

The outlet works will be at the downstream end of the tunnel on the west side of Roundout, the collection reservoir for the entire Delaware system. This contract includes an 800-ft-long steel interlining encased in concrete masonry and lined with cement mortar. The steel interlining is a substitution for a concrete masonry lining omitted under a previous contract. It will require 530,000 lb of steel. Prices ranged from Rosoff Bros. & Foster-Newman's low of $0.30 to a high of $0.60.

The intake works will control the admission of water from Cannonsville into the 14-ft, 4-in.-dia West Delaware Tunnel. The outlet works will meter, control and dissipate energy from the water as it flows through the 44 mile tunnel and prior to its entrance into Roundout.

During the contract period, Route 55A, which passes the outlet works, or an approved detour, must be available for public use at all times.

The construction areas under these contracts are on lands owned by the city. They are near trucking routes and about nine miles from the Deposit Station on the main line of the Erie Railroad.

Wage rates include: carpenters, $3.92/hr plus $0.274 welfare and pension fund; cement masons, $3.80/hr for intake works, and $4.20 plus $0.10 WF for outlet works; shovel and trenching machine operators, $5.10 plus $0.30 WF & PF; laborers, $3.03 plus $0.12 WF for outlet works, and $2.795 plus $0.10 WF for surface labor, intake works.

The bidding included:

### Intake Works—West Delaware Tunnel

1C Johnson, Drake & Piper, Inc., New York, N. Y. ..... $2,570,993
2 The Lane Const. Corp., Meriden, Conn ..... 2,691,010
10 Savin Bros., Inc., Bloomfield, Conn ..... 3,282,970

| Bids: 1-10-61 Items | Unit | Quantity | Unit Prices 1C | 2 |
|---|---|---|---|---|
| Exc, earth | cy | 320,000 | $0.50 | $0.80 |
| rock | cy | 15,500 | 10.00 | 15.00 |
| Refilling & embanking | cy | 200,000 | 0.70 | 0.75 |
| Embanking, rock | cy | 55,000 | 1.00 | 2.50 |
| Slope protection | cy | 14,000 | 2.00 | 4.50 |
| Dressing & grassing surface | cy | 2,800 | 1.50 | 4.00 |
| Tmbr & lumber | Mfbm | 55 | 400.00 | 400.00 |
| Water stops, rubber | lb | 2,200 | 2.00 | 2.00 |
| Conc masonry | cy | 12,500 | 80.00 | 61.00 |
| Piles | lf | 900 | 10.00 | 8.00 |
| Rubble paving in mortar | cy | 125 | 50.00 | 45.00 |
| Ctg, protective, cmt mortar | cy | 140 | 40.00 | 80.00 |
| Holes, drill in rock or masonry | lf | 30,000 | 0.30 | 2.75 |
| Pipes, steel for grouting | lb | 6,000 | 0.60 | 0.70 |
| Connections for grouting | ea | 350 | 5.00 | 20.00 |
| Grout, mix & place | cy | 600 | 25.00 | 40.00 |
| Portland cmt | bbl | 25,000 | 4.00 | 5.00 |
| Stone crushed & gravel | cy | 425 | 15.00 | 15.00 |
| Sand, for filters, grout, & protective ctg cmt mortar | cy | 175 | 10.00 | 15.00 |
| Pipes, non-metallic | lf | 4,300 | 4.00 | 2.00 |
| Steel, for reinf conc | lb | 600,000 | 0.20 | 0.17 |
| str | lb | 80,000 | 0.30 | 0.22 |
| Rock bolting | lb | 100,000 | 0.20 | 0.15 |
| Pipes, chlorine solution | lb | 3,500 | 1.50 | 2.20 |
| CI, WI, & steel | lb | 42,000 | 0.60 | 0.30 |
| CI, articles | lb | 150,000 | 0.25 | 0.25 |
| Aluminum, brass, bronze, copper articles | lb | 8,000 | 2.00 | 3.00 |
| Steel, stainless, articles | lb | 10,000 | 2.00 | 5.00 |
| Met work, misc | lb | 140,000 | 0.50 | 0.30 |
| Equip & met work furn by city, caring for, instal, & testing | lb | 240,000 | 0.20 | 0.12 |
| Pumpage, chlorination & treatment | mach-mo | 50 | 40.00 | 500.00 |
| Chlorine liquid, aluminum & lime | lb | 20,000 | 0.20 | 0.20 |
| Office, engineer | ls | job | 10,000 | 20,000 |
| Pumping | ls | job | 40,000 | 80,000 |
| Steam control | ls | job | 50,000 | 40,000 |
| Sanitary service | ls | job | 5,000 | 30,000 |
| Cleaning up | ls | job | 15,000 | 25,000 |
| Clear & grub | ls | job | 20,000 | 12,000 |
| Water, equip, furn | ls | job | 3,000 | 3,000 |
| apply | Mgal | 470 | 2.00 | 4.00 |
| Exc, uncl | cy | 71,000 | 2.00 | 0.80 |
| trench & culv | cy | 3,000 | 2.00 | 8.00 |
| Trim road section | lf | 4,550 | 1.00 | 0.60 |
| Grade, fine, prepare | sy | 7,400 | 0.50 | 0.15 |
| VCP, underdrain, 6" ϕ | lf | 5,200 | 1.20 | 1.00 |
| BCP, culv, 24" ϕ | lf | 540 | 10.00 | 12.00 |
| 30" ϕ | lf | 100 | 15.00 | 20.00 |
| Portland cmt, tp 2 | bbl | 280 | 4.00 | 5.00 |
| Calcium chloride | t | 10 | 100.00 | 90.00 |
| Conc, cl 1 | cy | 110 | 200.00 | 90.00 |
| Met, misc | lb | 6,200 | 0.50 | 0.40 |
| Rail, beam tp guide, RR rail posts | lf | 4,100 | 5.00 | 2.75 |
| Fdn crs, granular mat, tp A | cy | 5,900 | 2.00 | 2.00 |
| Posts, guide, reinf conc | ea | 35 | 10.00 | 10.00 |
| Bottom crs, bit macadam penetration meth asph | cy | 860 | 13.00 | 10.00 |
| Asph conc, mix meth, two crs | t | 1,070 | 15.00 | 13.00 |
| Bit mat A, paving | gal | 15,750 | 0.25 | 0.16 |
| Stone filling | cy | 200 | 10.00 | 12.00 |
| Gravel, screened | cy | 1,100 | 10.00 | 8.00 |
| Gutters, cobble | sy | 400 | 12.00 | 8.00 |
| Tmbr & lumber | Mfbm | 1 | 500.00 | 300.00 |
| Fill, band gravel | cy | 50 | 4.00 | 4.00 |
| Seeding | acre | 10 | 325.00 | 325.00 |
| Sodding | sy | 4,400 | 2.00 | 2.25 |

### Outlet Works—West Delaware Tunnel

1C Rosoff Bros. Inc., & Foster-Newman Contr. Co., Inc., New York, N. Y. ..... $2,091,980
2 Johnson, Drake & Piper, Inc., New York, N. Y. ..... 2,197,950
10 Hagan Industries Inc., Elmhurst Contr. Co. Division, Corona, N. Y. ..... 2,899,350

| Bids: 1-10-61 Items | Unit | Quantity | Unit Prices 1C | 2 |
|---|---|---|---|---|
| Soil, removal | cy | 100 | $3.00 | $8.00 |
| Exc, earth | cy | 40,000 | 1.50 | 0.50 |
| rock | cy | 8,500 | 24.00 | 5.00 |
| Refilling & embanking | cy | 35,000 | 3.00 | 3.00 |
| Dressing & grassing surface | cy | 10,000 | 5.25 | 2.00 |
| Tmbr & lumber | Mfbm | 3 | 1,000 | 500.00 |
| Conc masonry, in tunnel | cy | 2,600 | 35.00 | 105.00 |
| in open cut | cy | 6,300 | 67.00 | 100.00 |
| Cmt mortar lining | lf | 950 | 20.00 | 25.00 |
| Rubble paving, dry | cy | 110 | 60.00 | 30.00 |
| masonry & paving in mortar | cy | 600 | 75.00 | 40.00 |
| Pipes, vitrified, porous conc, ash-cmt | lf | 2,000 | 3.00 | 4.00 |
| Holes, drill in rock or masonry | lf | 4,500 | 2.00 | 0.50 |
| Grout, mix & place | cy | 44,000 | 0.27 | 0.30 |
| Stone crushed, gravel & sand | cy | 150 | 8.50 | 15.00 |
| Portland cmt | bbl | 17,000 | 5.00 | 5.00 |
| Steel, for reinf conc | lb | 400,000 | 0.15 | 0.17 |
| Water stops, rubber | lb | 4,500 | 2.25 | 3.00 |
| CIP, blow-off | lb | 44,500 | 0.27 | 0.30 |
| Steel interlining, tunnel | lb | 530,000 | 0.30 | 0.30 |
| Cond, steel pipe | lb | 370,000 | 0.75 | 0.55 |
| Steel pipe, clad | lb | 160,000 | 1.11 | 1.20 |
| CI, WI, & steel | lb | 180,000 | 0.35 | 0.30 |
| Aluminum | lb | 16,000 | 2.00 | 2.00 |
| Brass, bronze, copper | lb | 4,000 | 2.50 | 1.50 |
| Steel, stainless | lb | 5,200 | 4.45 | 3.00 |
| Fencing, wire | lb | 22,000 | 0.38 | 0.30 |
| Pvt, bit macadam | cy | 500 | 15.00 | 16.00 |
| Equip, misc | ls | job | 8,100 | 20,000 |
| Valves | ls | job | 7,500 | 10,000 |
| Dehumidifying equip | ls | job | 6,850 | 5,000 |
| Equip & met work furn by city, caring for, instal, & testing | lb | 500,000 | 0.04 | 0.10 |
| Pumping from tunnel | mg | 300 | 50.00 | 60.00 |
| Pumpage, chlorination & treatment | mach-mo | 50 | 50.00 | 40.00 |
| Chlorine liquid, aluminum & lime | lb | 8,000 | 0.20 | 0.20 |
| Superstructure | ls | job | 20,800 | 15,000 |
| Painting | ls | job | 6,000 | 1,500 |
| Office, engineer, maintain & service | ls | job | 9,000 | 5,000 |
| Sanitary service | ls | job | 16,500 | 5,000 |
| Cleaning up | ls | job | 5,000 | 5,000 |

Completion time: 27 months
Liquidated damages: $500.00 per day

ENR Construction Cost Index (1913=100) 20-cities average—834.32

# Materials Prices

Monthly Market Quotations By ENR Field Reporters

**See following ENR issues for OTHER PRICES:**

- Wood Products, Glass, Explosives, Chemicals: Last, Apr. 20; Next, May 18.
- Wage Rates Building Board Insulation: Last, Mar. 30; Next, May 4.
- Iron & Steel Products, Pipe: Last, Apr. 13; Next, May 11.
- Cement, Agsregate, Ready Mixed Concrete, Asphalt: Last, Apr. 6; Next, May 4.

## STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

| Item | Unit | Atlanta | Balti-more | Birming-ham | Boston | Chicago | Cincinnati | Cleve-land | Dallas | Denver | Detroit | Kansas City | Los Angeles | Minne-apolis | New Orleans | New York | Phila-delphia | Pitts-burgh | St. Louis | San Fran-cisco | Seattle | Montreal | Toronto |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **STRUCTURAL CLAY TILE** | | | | | | | | | | | | | | | | | | | | | | | |
| partition-scored | | | | | | | | | | | | | | | | | | | | | | | |
| 3x12x12 in. | M | $154.95pe | $217.00 | $135.00pss | $232.00† | $137.00ll | $179.00mmjvv | $205.00ff | $162.00 | $170.00 | $257.00 | $158.00 r | $218.00pe | $178.00 | $236.00wwh | $258.00ss | $200.00t | $180.00mmpp | $156.85* | $235.00pt | $168.78Ruqoo | $169.00rr |
| 4x12x12 in. | " | 154.95pkke | 231.00 | 152.00pss | 248.00†mm | 149.00ll | 190.00mmjvv | 219.00f | 162.00 | 185.00 | 274.00 | 158.00 r | 225.00pe | 178.00 | 315.00wwh | 276.00ss | 213.00t | 199.00pp | 177.10* | 270.00pt | 180.93auqoo | 185.50rr |
| 8x12x12 in. | " | 309.90pe | 434.00 | ..... | 463.25†mm | 280.00ll | 355.00jddmm | 410.00 | 318.75 | 310.00 | 514.00 | 312.00 r | 452.00pe | 371.25 | 378.00wwch | 517.00ssxx | 400.00t | 380.00pp | 235.30dd | 490.00pt | 325.00ausqoo | 360.00rr |
| Load Bearing—Scored | | | | | | | | | | | | | | | | | | | | | | | |
| 8x12x12 in. | " | 387.40pe | 491.00 | 303.00p | 556.00†mm | ..... | 390.00jmmvv | 465.00ii | 387.00 | 310.00 | 582.00 | 312.00 r | 225.00pwe | 371.25 | 384.00wwhn | 586.00ss | 453.00t | 410.00pp | 159.40qq | 265.00pwt | 220.00qoo | 281.50rr |
| 10x12x12 in. | " | ..... | 602.00 | 376.00p | ..... | ..... | 422.00jmmvv | ..... | 472.50 | 390.00 | 767.00 | 400.00 r | ..... | ..... | ..... | ..... | 607.00t | 440.00pp | ..... | ..... | 400.00qoo | 405.00rr |
| 12x12x12 in. | " | ..... | 690.00 | 465.00p | ..... | ..... | 500.00jmmvv | 709.00ff | 385.00 | 442.00 | 876.00 | 500.00 r | ..... | ..... | ..... | ..... | 693.00t | 621.50pp | ..... | ..... | ..... | ..... |
| BRICK, common backing | " | 33.25uu | 36.00 | 27.00† | 43.50p | 32.00 | 50.00jk | 43.25tt | 30.00 | 35.00xx | 53.50pmm | 34.00 | $42.00uu | 49.50vpe | 42.00 | 46.00p | 40.00mm | 42.00t | 44.00mmpp | 43.00* | 57.00t | 48.25b | 25.00rr |
| Straight hard | " | 33.25uu | 41.00 | 38.00jk | 58.00p | 34.00 | 49.00jk | 47.25ggtt | 51.00 | 54.00 | 54.00pmm | 34.00 | 44.00 | 58.00vpe | 55.00 | ..... | 45.00mm | 40.00t | 45.50pp | 43.00* | 71.00t | 56.30bll | 65.00rr |
| LIME, in paper, Hyd. fin. | " | 42.50hh | 35.80 | 38.28mm | 42.00§ | 1.00aau | 29.20jmm | 32.75ptt | 43.5h | 48.00p | 38.00mm | 36.26 | 38.00mn | 150.00bbe | 48.00p | 40.00p | 40.00mmp | 30.00t | 1.00aapp | 29.24 | 52.00bbt | 39.00 | 34.00mm |
| " " ' Com hyd. | " | 35.50hh | 23.40 | 20.87mm | 34.00§ | 0.90alaa | 29.20jmm | 28.00ptt | 25.32 | 44.00p | 30.00mm | 34.26 | 38.00mn | 140.00bbe | 40.00p | 38.00p | 24.50 | 26.00t | 0.80aapp | 29.24 | 38.00bbt | 22.00 | 36.40mm |
| " " ' pulverized | " | ..... | ..... | 26.33gmm | ..... | ..... | 29.20jmm | ..... | 28.00 | 46.00p | 40.00mm | 29.76 | 39.00mn | 152.00bbde | ..... | ..... | 27.50 | 34.00t | 1.35zaapp | 31.74 | 1.30mbbt | 13.25 | 34.75mm |

*§ F.o.b. yard. *• F.o.b. plant Stockton. *† F.o.b. yard Roxbury. *a Smooth. *b $4.50 del. *c 8 x 12 x 12 in.-6 cell. *d Pulver-ized hot. *e less 5% disc., 10th. *f 8 x 8 x 12. *g Lumps, $26.72. *h F.o.b. trucks, job site N.Y.C. *i 60 lb sacks. *j Truck load or over. *k $1.00 discount per M, 10 days. *m Per bb. 180 lb. processed. *n 7¾ x 7¾ x 12. *o Mason's double hydrated pressure. *p Truck lots. *q Provincial and Municipal tax extra (6%). *r Not used: earthquake danger. *s 8 x 16 x 12. *t less 2% disc., cash. *u Incl. Federal tax. *v Sand lime. *w 8 x 8 x 12. *x dumped. *y Chi common. *z Pebble; 80 lb sack. *aa 50 lb sack. *bb LCL. *dd 6 x 12 x 12. *ff 80% common. *gg Smooth. *hh less 25¢ disc., cash. *ii F.o.b. plant. *jj rough; smooth; $40. *kk 3½ x 11½ x 11½. *ll less 2% disc. 10th. *mm less 2%, 10 days. *nn F.o.b., L. A. *oo less 2%, 30 days. *pp add 2% sales tax. *qq 8 x 5½ x 11½. *rr 2½% disc., 10 days. *ss 5% disc., 10 days. *tt less 2% disc., 15th. *uu less 50¢/M, 10 days. *vv 4000 pcs. and over. *ww Now manufactured in perodic instead of tunnel kiln.

## PAINT, ROOFING—F. O. B. CARLOAD LOTS

| Item | Unit | Atlanta | Balti-more | Birming-ham | Boston | Chicago | Cin-cinnati | Cleve-land | Dallas | Denver | Detroit | Kansas City | Los Angeles | Minne-apolis | New Orleans | New York | Phila-delphia | Pitts-burgh | St. Louis K | San Fran-cisco | Seattle | Montreal | Toronto |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **LEAD**, red, dry | CWT | $13.75ggJO | $17.50pp | $26.00†J | $24.95†oomm | $15.25rjqqpp | $15.25†JO | $25.65† | $22.50 | $23.85n | $15.75r | $26.90ggool | $16.25yy | $16.25N | $23.00Jpp | $15.70ooO | $14.75mmO | $21.50mggJ | $25.65†m | $26.70mm | $13.35HO | $19.45O | $13.95 |
| White, in oil | " | 24.00ggJ | 24.00 | 29.00†J | 26.90†mmm | 24.00†J | 24.00†J | 26.90† | 23.50M | 24.00 | 24.00rr | 25.65 | 22.00 | 21.50kk | 24.00J | 29.75 | 19.00mm | 24.00J | 26.90 | 29.90mm | 24.00H | 26.00wtt | 20.85 |
| **READY-MIXED PAINT** | | | | | | | | | | | | | | | | | | | | | | | |
| Graphite b. | gal | 3.59 | 3.00 | 3.90J | ..... | ..... | ..... | 3.18ggP | ..... | 3.70 | ....mm | 3.99 | 3.30 | ..... | ..... | ..... | 3.35mm | 2.20†EJ | ..... | 3.20mm | ..... | 5.52Dfft | 5.15J |
| Aluminum | " | 3.86 | 4.40 | 3.40J | ..... | ..... | ..... | 3.29zggg | 3.25B | 5.10 | ....mm | 3.43 | 4.50n | ..... | ..... | ..... | 3.90mm | 2.25†FJ | ..... | 4.30mm | 4.19ccffJ | 6.55xff | 6.18J |
| Ferric Oxide | " | 3.31 | 3.50 | ..... | ..... | ..... | ..... | 4.20qgg | ..... | ..... | ....mm | 3.01 | 4.20n | ..... | ..... | ..... | 3.65mm | 2.25†GJ | ..... | 3.50mm | ..... | 5.10kfft | 5.95J |
| **ROOFING SUPPLIES** | square | 2.90kk | 3.06 | 2.95†mm | 3.55q | 3.45ukk | 2.99mm | 2.85q | 3.00u | 2.94 | 2.85mm | 3.00mm | 3.40mkk | 2.85kk | $2.78 | 2.99xx | ..... | 2.90kH | 2.99iimm | 2.87mm | 3.70ccH | 5.40 | 3.50 |
| Rolls, slate surf. | CWT | 2.25kk | 3.67 | 2.17ii†mm | 2.60q | 2.75okk | 2.19mm | 2.10o | 3.00o | 2.25o | 2.10ommll | 2.50omm | 2.40njkk | 2.10hikk | 1.98 | 2.19xxo | 2.65 | 2.15sH | 2.19hhK | 1.72aaiimm | 3.06bccH | 4.65f | 2.75aae |
| Asphalt felt | " | 2.85kk | 4.04 | 3.17ii†mm | 3.04q | 3.15okk | 2.64omm | 2.55o | 3.00o | 2.80o | 2.55ommll | 2.50omm | ..... | 2.55bikk | 2.85 | 2.64o | 1.81 | 2.15H | 2.64hhK | 2.59mm | ..... | 4.65f | 2.75o |
| Asphalt coating | gal. | 0.67kk | 0.50 | 0.76ffmm | 0.55q | 48.00bbkk | 0.56ymm | 0.41y | 0.47O | 0.50i | 0.56ffmm | 0.55y | 0.75nykk | 0.52ikk | 0.68 | 0.52z | 0.74 | 0.56H | 0.58yK | 0.46jj | 0.59cc | 1.60 | 0.70j |
| tar pitch | ton | 65.35kk | 54.00 | 48.00eemm | 60.00q | 57.70†kk | 57.96Hmm | 49.00gg | 66.00hh | 50.00 | 49.00mm | ..... | s..... | 50.00rkk | 45.50 | 49.00* | 49.00 | 55.00H | 57.60K | 54.00 | ..... | 4.40uu | 57.00A |

*† Delivered. * Note: Red lead in oil 50% higher than white lead in oil. *• Aver. wt. approx. 425 to 550 lb drums. *a Red lead prices change frequently due to pig lead price changes. *b U.S. War Dept. Spec. 3-49A. *c ASTM Spec. D266-31. *d 80% minimum ferric oxide. *e Per 108 sf roll. *f Per 432 sq ft. *g F.o.b. yard Roxbury. *h Per roll, 65 lb. *i Net carload prices, Minneapolis and vicinity. *j 45 gal containers. *k Over 60% ferric oxide. *l Not used. *m 100 lb keg. *n F.o.b. city. *o Per 60 lb roll. *p 6-drum, 50 gal each. *q Per 90-lb roll. *r F.o.b. factory, Chicago. *s Truckload. *t Incl. Federal tax. *u Per 90-lb square. *v Per ton. *x Ready-mixed. *y 55-gal container. *z Drums. *aa 15 lb. *bb Roofers coating and cement. *cc LCL, truck delivery. *ee Asphalt pitch in 100 lb package. *ff 5-ga drums. *gg F.o.b. factory. *hh Incl. freight. *ii Per 324 sf roll. *jj Asbestos roof coating. *kk less 2% disc., 10th. *mm less 2% disc., 10 days. *oo 100 lb bbls. *pp 50 or 100 lb bags. *qq 500 lbs or more. *rr F.o.b. plant, Detroit. *ss 50 lb bbls. *tt 25 lb kegs. *uu 250 lb bbls. *xx Sept.: Rolls revised to $2.75, Asph. Felt revised to 1.71. *yy Sept. revised to $12.00. *zz Sept. revised to $2.80. *A 400 lb barrels. *B ASTM Spec. D962-49. *C 95%. *D Std. black. *j Milt. spec.: *E TTP27; *F TTY81; *G TTP31. *H less 2% disc., cash. *I Per 100 lb. *J less 1% disc., 10 days. *K add 2% sales tax. *L CL. *M 1 ton or more. *N under 500 lbs, add $1. *O 50 lb. bag.

## PLASTER, VERMICULITE AND METAL BUILDING SHEETS

| Item | Unit | Atlanta | Balti-more | Birming-ham | Boston | Chicago | Cin-cinnati | Cleve-land | Dallas | Denver | Detroit | Kansas City | Los Angeles | Minne-apolis | New Orleans | New York | Phila-delphia | Pitts-burgh | St. Louisuu | San Fran-cisco | Seattle | Montreal | Toronto |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **PLASTER**, neat | ton | $32.00ss | $24.00 | $37.00ss | $26.00 | $1.45bbtt | $24.95*ss | $29.00*ss | $34.50 | $29.00 | $28.00ss | $30.00 | $28.00tt | $36.00F | $34.00 | $27.00 | $27.00 | $30.00nn | $30.00 | $29.50ss | $42.40nn | $22.60h | $0.70bb |
| gauging | " | 42.00ss | 35.70 | 43.00ss | 30.00 | 1.45bbtt | 24.95* | 45.00N | 34.50 | 29.00 | 28.00ss | 35.00 | 29.00tt | 36.00F | 48.00 | 35.00 | 33.00ss | 31.00nn | 42.00 | 30.50ss | 45.60nn | 35.60h | 1.25bb |
| **VERMICULITE** | | | | | | | | | | | | | | | | | | | | | | | |
| Home insul. pellets | 4 cf bag | 1.55ess | 0.95 | 1.55ss | 1.40 | 1.55 | 1.75*ss | 1.14ss | 1.05 | 1.63 | 1.27ss | 1.19E | 1.25 | 1.65tt | 1.32P | 1.35 | 1.40ss | 1.25nn | 1.50 | 1.38ss | 1.55nn | 1.25h | 1.47bb |
| plaster agg. | " | 1.65ess | ..... | 1.55ss | 1.40 | 1.60 | 1.75*ss | 1.16ss | 1.21 | 1.40 | 1.31ss | 1.21E | 1.20kttt | 1.80F | 1.23P | 1.38 | 1.25ss | 1.30nn | 1.60 | 1.38ss | 1.35knn | 1.40h | 1.43bb |
| concrete agg. treated | " | 1.80ess | ..... | 1.60ss | 1.40 | 1.60 | 1.85*ss | 1.24ss | 1.37 | 1.50l | 1.40ss | 1.29E | 1.45 | 1.95Fl | 1.40P | 1.50 | 1.45ss | 1.40mm | 1.65 | 1.50ss | 1.85lnn | 1.60h | 1.66bb |
| **PERLITE**, plaster agg. | " | 1.65ss | 1.15 | 1.27ss | 1.55ee | 1.60 | 1.75ss | 1.45ss | 1.21 | 1.50ss | 1.45kii | 1.21 | 1.16 | 1.40S | 1.15P | 1.45 | 1.05ss | 1.40nn | 1.50 | 1.38oss | 1.50k | 1.15v | 1.14Q |
| concrete agg. untreat. | " | 1.65ss | 1.55 | 1.27ssl | 1.55ee | 1.60 | 1.75ss | 1.45ss | 1.32 | 1.60ss | 1.50kii | ..... | 1.26 | 1.50S * | 1.15P | 1.40 | 1.05qqss | 1.40nn | 1.60 | 1.58oss | ..... | 1.15v | ..... |
| **BUILDING SHEET** | | | | | | | | | | | | | | | | | | | | | | | |
| Alum. flat, .100" | lb | 0.463noo | 0.462 | 0.459M | 0.474 | 0.564x | 0.469 | 0.459aa | 0.469 | 0.479 | 0.475a | 0.463 | 0.459 | 0.469 | 0.469 | 0.489aT | 0.479 | 0.475 | 0.479 | 0.575 | 0.50D | 43.95AH | 0.4375 |
| corr. roof, .032" | sheet | 27.17nY | 0.451r | 9.66K | 25.07AAp | 33.43p | 9.35 | 25.07p | 0.484r | 10.89 | 10.35a | 24.66ggyyp | 8.772Z | 10.09 | 33.43 | 0.2507aXAA | 10.98 | 10.39 | 9.18 | 10.83 | 10.75D | 12.10H | 26.00ap |
| Stainless steel, 20 ga | CWT | 65.68nxx | 63.00 | 64.50K | 64.42*ddxx | 64.15ee | 61.00xx | 63.33ooxx | 64.09 | 65.32gg | 63.00axx* | 67.50E | 65.02 | 63.61GR | 63.00Y | 64.08a | 63.71 | 63.00 | 63.39Kmngg | 65.00K | 54.02D | 65.75H | 73.74 |
| 28ga. | " | 74.43nxx | 71.25 | 73.00K | 72.67dd | 72.40ee | 71.25xx | 71.58ooxx | 72.34 | 73.57gg | 71.25axx* | 76.25E | 73.27 | 69.61ffG | 83.50Y | 72.33a | 71.96 | 74.50pp | 71.64ygg | 77.25K | 73.27D | ..... | 86.52 |

*‡ truckloads, delivered *† fob warehouse. *• fob city. *a delivered. *b 1½" O.D. *c ½" O.D. *d per sf. *e 34" x 60" sheet. *f per 100 ft. *g 5 tons & up: cold roll, anneal & pickled 2B finish. *h incl. Federal tax. *i add 25¢ per pint of additive. *j 1100 & 3003 alloy, mill finish. *k bag of 3 cu ft. * treated with air entraining agent. *m 2-10M ft. *n fob mill tr equalized with nearest stocking competitor. *o 250 sacks or more. *p 100 sq ft. *r per lb. *s 30 lb bag. *t 36" x 108";-10.81 lb/sh; 48" x 144"; 21.7 lb/sh. *u 19.31 lb/sh. *v fob plant. *w 48 x 144" *x 0.11"th. *y 27 gauge *aa 16M lb & up. *bb Per 50 lb bag. *dd add $1.00 cwt boxing. *ee 5 tons & up. *gg add $2/cwt boxing; $0.75/cwt on skids. *hh Theoretical wt for 48" x 96"; 60.4-lb per sh. *ii 300-bag lots. *jj 100-lb bag. *mm Theoretical wt; 19.7-lb per sh. *nn 2% cash. *oo skid packed. *pp type 304. *qq Philadelphia and suburbs. *rr less 2% disc. 15 days. *ss less 2% disc. 10 days. *tt less 2% disc. 10th. *uu add 2% sales tax. *vv Type N. *xx less ½% disc. 10 days. *yy .021 ga. *zz .061" th. *A Per 100 lb. *C 15M lb. *D less ½% for cash. *E Quantity differential. *F less 5% disc. 10th. *G less ½% disc. 10th. *H Fed. tax exempt. *K less ½% 10 days. *L 5% disc. 30 days. *M 3003: .462 for 1100. *N less 2%, 15th mo. *O less $2, cash & carry. *P less 2%, 15 days. *Q per ton. *R revised. *S add .10/bag under 200 bags. *T 5000# quantity on 4000# skids. *U 30 Msf quantity; $0.245 in 10 Msf quantity. *X per sq ft. *Y per sheet. *Z 6,000 lb or over. *AA 30,000 sf or over.

## Bids Asked—Low Bidders—Contracts Awarded—

## NEW ENGLAND

### BUILDINGS—BA

▲ **Conn., Torrington** — BA 5/5 — Town, Purch. Agt., Town Hall, 3 story, 4 unit, 2 wing HIGH SCHOOL, Elise Besse Park. $2,565,000. Plans deposit $100. Michols & Butterfield, 998 Farmington Ave., West Hartford, archts. Extended date. CD 3/27/61.

▲ **Mass., Hamilton**—BA 5/11—Hamilton-Wenham Regional School Dist., Winthrop School, Bay Rd., Hamilton, REGIONAL HIGH SCHOOL, Bay Rd. $2,050,000. Plans deposit $100. Kilham, Hopkins, Greeley & Brodie, 9 Arlington St., Boston, archts. CD 1/26/60, under Mass., Wenham.

▲ **Mass., Springfield**—BA 5/24—City Housing Auth., 51 Robert Dyer Circle, Phase 1, 400 unit LOW-RENT HOUSING. $7,000,000. Caola Assocs., 57 Pearl St., archts.-engrs.

### HEAVY CONSTRUCTION—LB & CA

▲ **Massachusetts Port Auth.**, 141 Milk St., Boston, Mass., cancelled bids to have been opened Apr. 20, MPA 1.018 REHABILITATION of RUNWAYS 41-22R-4R22L and 9-27, HOLDING APRON 221, Logan International Airport, EAST BOSTON, MASS. $2,080,000. CD 4/11/61.

▲ **CONNECTICUT**—State Hy. Dpt., 170 Douglas St., Hartford, Bids opened 4/17, ROAD,
**Savin Brothers, Inc.**, 522 Cottage Grove Rd., Bloomfield, Conn., LB $2,344,053, (6 bidders) 3,350 lin. ft. rein.-con. pavement, incl. bridge structure on Interstate Rte. 91, Proj. 63-127, Hartford, CD 4/13/61.

## MIDDLE ATLANTIC

### BUILDINGS—BA

▲ **N. Y., Baldwin**—BA 5/11—Bd. Educ. UFSD No. 10, Pershing Rd., general contract (combined bids only) all other, separate or combined bids accepted, JUNIOR HIGH SCHOOL, $2,725,000; ELEMENTARY SCHOOL, $1,600,000. Frederic P. Wiedersum, Assocs., 65 Roosevelt Ave., Valley Stream, archts. CD 11/4/60.

▲ **N. J., New Brunswick**—BA 5/16—Rutgers University, College Ave., DORMITORIES, Bishop Campus, Rutgers University. $4,000,000. Ketchum & Sharp, Hy. 206, Somerville, archts. CD 12/13/60.

### HEAVY CONSTRUCTION—LB & CA

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg, ROAD,
**James D. Morrissey, Inc.**, 9119 Frankford Ave., Phila., Pa., CA $2,032,343, (9 bidders), 13,691 ft. divided hy. rein.-conc. 24 ft. wide each side median, grading and drainage, L. R. 1002(4), Interstate (Pen Can), Monroe Co., BA 5/24/61. CD 3/30/61, under LB.

▲† **C. J. Langenfelder & Son, Inc.**, 8427 Pulaski Highway, Baltimore, 24, Md., CA $2,744,320, (10 bidders), relocation RAILROAD TRACKS Shenango River Reservoir, ENG-36-058-61-29, Sharpsville, PENNSYLVANIA. U. S. Eng., 925 New Federal Bldg., Pittsburgh 19, Pa. BA 4/11/61. CD 3/15/61.

### BUILDINGS—LB & CA

▲ **Irons & Reynolds, Inc.**, 420 Lexington Ave., New York 17, N. Y., CA $2,000,000, 6 story HOSPITAL ADDN., BRONXVILLE, N. Y. Lawrence Hospital, 55 Palmer Ave., Bronxville, N. Y. BA 12/1. CD 4/12/61, under LB.

▲ **Alexander Muss & Sons, Inc.**, Time Life Bldg., New York 20, N. Y., Owner Builds, Over $5,000,000 20 story, 380 unit Seacoast Towers No. 2 APARTMENT, Brightwater Ave., BROOKLYN, N. Y. A. H. Salkowitz, 87-25 Homelawn St., Jamaica, N. Y., archts. CD 3/2/61.

▲ **Alexander Muss & Sons, Inc.**, Time & Life Bldg., New York 20, N. Y., Owner Builds, $7,500,000, 250 HOUSES, 75 acres, Union Turnpike Extension between Marcus Ave. and Old Court House Rd., HERRICK (BR. WILLISTON PARK), N. Y. A. H. Salkowitz, 87-25 Homelawn St., Jamaica, N. Y., archts. CD 3/2/61.

▲ **Diesel Constr. Co.**, 642 5 Ave., New York 19, N. Y., CA Est. $3,500,000, 11 story 300-room Loew's Midtown MOTOR HOTEL, 8 Ave between W.48 and W.49 Sts., NEW YORK, N. Y. Loew's Inc., 1540 Broadway, New York 36, N. Y. Lapidus, Kornblath, Harle & Liebman, 139 E.56 St., New York 22, N. Y., archts.

▲ **Diesel Constr. Co.**, 542 5 Ave., New York 19, N. Y., CA Est. $3,500,000, 12 or 13 story 300-room Loew's Motor Inn MOTEL, west side 8 Ave. between 51 and 52 Sts., NEW YORK, N. Y. Loew's, Inc., 1540 Broadway, New York 36, N. Y. CD 10/4/60.

▲ **Fisher Brothers**, 6 E.45 St., New York 17, N. Y., Owner Builds, $2,500,000, 17 story APARTMENT, 785 5 Ave. at E.60 St., NEW YORK, N. Y. Emery Roth & Sons, 400 Park Ave., New York 22, N. Y. archts. CD 12/13/60.

▲ **Richland Agency, Inc.**, 20 Exchange Pl., New York, N. Y., Owner Builds, $2,000,000, GOLF CLUB, incl. 18 hole golf course, motel, swimming club, Rte. 527, Manalapan Twp., FREEHOLD, N. J. James Gilmore Harrison, 266 Harrison Rd., Turtle Creek, Pa., archt. for golf course. CD 2/2/61.

▲ **Frank Briscoe Co., Inc.**, 287 South 19th St., Newark, N. J., CA Total est. $9,000,000, 3 story, 250,000 sq. ft. ENGINEERING OFFICE, Columbia Rd., MORRISTOWN, N. J. Allied Chemical Corp., Columbia Rd., Morristown, N. J. Voorhees, Walker, Smith, Smith & Haines, 101 Park Ave., New York, N. Y., archts.

▲ **Andover Bldg. Co., Inc.**, c/o S. Zel Bender, archt., 225 S. 6th St., Camden, N. J., Owner Builds, $6,000,000, $4,000,000 1st year, 2 years to complete, 400 unit RESIDENTIAL DEVELOPMENT, New Albany Rd. and Chestnut Hill Dr., RIVERTON, N. J.

▲ **Christopher Gigliotti**, 9140 Veree Rd., Phila, Pa. Owner Builds, $2,000,000, RESIDENTIAL DEVELOPMENT (120) Buck Rd., HOLLAND, PA.

## SOUTH

### BUILDINGS—BA

▲ **Fla., West Palm Beach**—BA 5/5—J & N Constr. Co., Inc., c/o T. Trip Russell & Assocs., archts., DuPont Plaza Center, Miami, 10 story, 175 x 175 CB-S and RIC. LaFontana APARTMENT, $3,000,000. Sasnett Engr., Inc., DuPont Plaza Center Miami, mech. engr. Obooler & Clarke, 925 Arthur Godfrey Rd., Miami Beach, struct. engrs.

### HEAVY CONSTRUCTION—LB & CA

▲ **WEST VIRGINIA**—State Rd. Comn., Charleston, Zone 5, ROADS,
**Central Asphalt Paving Co.**, 914 Nelson Bldg., Charleston, W. Va., LB $2,007,530, c. conc. paving 6.065 mi. Interstate 64, Proj. I 64-1(47)26, Putnam and Cabell Counties; LB $1,720,931, c. conc. paving 4.788 mi. Interstate 64, Proj. I 64-1(4830), Putnam Co. (Correction—contractor.) BA 4/4/61. CD 4/11/61, under LB.

▲† **Frye Constr., Inc.**, 523 Michigan Ave., Miami Beach, Fla., CA $2,402,393, IMPROVEMENTS to Wherry HOUSING, U. S. Naval Base, NBy-34529, Spec. 34529/60, KEY WEST, FLA. Dist. P. Wks. Bldg. Sixth Naval Dist., Bldg. 13, U. S. Naval Base, Charleston, S. C., BA 4/6/61. CD 4/12/61, under LB.

▲ **ALABAMA**—State Hy. Dpt., Montgomery Zone 4, ROAD,
**Foster & Creighton Co.**, American National Bank Bldg., Nashville, Tenn., CA $2,024,980, base and conc. pavement 7.277 mi. from Eden E. of River side on Interstate Rte. 20, St. Clair Co. BA 1/27/61. CD 2/3/61, under LB.

▲† **Dravo Corp.**, Dravo Bldg., Pittsburgh, Pa., LB $2,339,745, est. $2,100,000, (7 bidders), POWER HOUSE COFFERDAM and part of Barrier for Barkley Dam, Lyon Co. CIVENG-40-058-61-18, KENTUCKY and TENNESSEE. U. S. Eng., P.O. Box 1070, Nashville 2, Tenn. BA 4/12. CD 3/16/61.

### BUILDINGS—LB & CA

▲ **Eugene Simpson & Brother, Inc.**, 300 Montgomery St., Alexandria, Va., CA $2,384,533, Hermitage HOME for the AGED, FRANKLIN Ave., ALEXANDRIA, VA. Virginia Conference of the Methodist Church, 4016 W. Broad St., Richmond, Va. BA 4/4/61. CD 4/7/61, under LB.

▲† **H. L. Cobie Constr. Co.**, 1705 Battleground Ave., Greensboro, N. C., LB $6,719,391, 430 Capehart HOUSING UNITS, Turner Air Force Base, Inv. 09-629-61-39, ALBANY, GA. Base Procurement Office, Turner Air Force Base, Albany, Ga. BA 3/16/61. CD 3/7/61

▲ **Lovell, Inc.**, 801 N.W. 79 St., Hialeah, Fla., Owner Builds, $3,750,000, 460 RESIDENCES, 5800 W. 14th St., HIALEAH, FLA. Thomas J. Kelly, 5139 S.W. 8th St., Miami, Fla., archt.

▲ **Town Hall Homes**, 10001 S.W. 83rd Court, Miami, Fla., Owner Builds, $4,000,000, 337 RESIDENCES, SWIMMING POOLS, South Miami Heights, MIAMI, FLA. Harry E. Penny, 9300 S. Dixie Hy., Kendall, Fla., archt.

▲ **Daniel Constr. Co. of Alabama, Inc.**, 822 7th Ave., Birmingham, CA Est. $7,000,000, 17 story OFFICE BLDG., 20th St. S. and Morris Ave., BIRMINGHAM, ALA. B. S. T. Corp., c/o Bank Savings & Trusts, 1924 1st Ave. N., Birmingham, Ala. Lawrence Whitten, Brown-Marx Bldg., Birmingham, Ala., archt. CA 4/8/61.

▲† **J. W. Bateson & Co., Inc.**, 1013 Monroe Dr., Dallas, Tex., CA $5,615,297, Capehart HOUSING NO 2, FORT KNOX, KY. U. S. Eng., P.O. Box 59, Louisville 1, Ky. BA 12/15. CD 12/19/60, under LB.

## MIDDLE WEST

### HEAVY CONSTRUCTION—BA

▲† **Michigan**—BA 5/11—U. S. Eng., 1101 Washington Blvd., Detroit, Zone 26, DREDGING Lake St. Clair and South East Bend Cut-Off, St. Clair River, to head of Detroit River, CIVENG-20-064-61-63. Under $6,000,000. CD 4/14/61.

### BUILDINGS—BA

▲ **Mich., Detroit**—BA 5/15—Bd. Educ., 1354 Broadway, Zone 26, HIGH SCHOOL, 20000 Evergreen Ave. $3,000,000. Plans deposit $50. Giffels & Rossetti, 1000 Marquette Bldg., Zone 26, archts. CD 9/29/60.

### HEAVY CONSTRUCTION—LB & CA

▲ **H. S. Kaiser Co.**, 3344 W. Franklin St., Chicago, Ill., LB $3,664,000, (6 bidders), AIR CONDITIONING MAIN POST OFFICE, CHICAGO, ILL. General Services Admin., 219 S. Clark St., Chicago 4, Ill. BA 4/17/61. CD 4/7/61.

### BUILDINGS—LB & CA

▲ **Concept Homes**, 305 S. Main St., Dayton 2, O., Owner Builds, $4,375,000 250 HOMES, Centerville Plat CENTERVILLE, O.

▲ **J. L. Simmons Co., Inc.**, 506 S. Wabash St., Chicago, Ill., CA $4,248,000, HOSPITAL ADDN., JOLIET, ILL. St. Joseph's Hospital, 372 N. Broadway, Joliet, Ill. BA 3/28/61. CD 4/14/61.

▲ **Edward Rose & Sons, Builders**, 14900 Linwood, Detroit 38, Mich., Owner Builds, $3,000,000, (2 year program) First Year $1,500,000, 100 HOMES, roads, sewers, water, Adams and Wattles Rds., North East of Birmingham, TROY, MICH.

## MISSISSIPPI TO ROCKIES

### HEAVY CONSTRUCTION—LB & CA

▲† **G. L. Tarlton Contg. Co.**, 5500 West Park, St. Louis 10, Mo. and **J. E. Latta Constr. Co., Inc.**, 6609 Latta Pl., St. Louis 33, Mo., LB $3,146,710, est. $2,929,565, (6 bidders), five PUMPING STATIONS and sewer alterations, Flood Protection, Proj. Items P-4 and S-4, St. Louis CIVENG-23-065-61-61, MISSOURI. U. S. Eng., 420 Locust St., St. Louis 2, Mo. BA 4/13. CD 4/5/61.

### BUILDINGS—LB & CA

▲ **Kandle, Iken & Rich Builders**, 701 Candlelight Lane, Olivette, Mo., Owner Builds, Total cost $4,000,000, First Year $1,000,000 (4-5 Year Program), The Four Seasons APARTMENTS, Incl. 120 RESIDENCES, Woods Mill and Olive Street Rds., OLIVETTE (ST. LOUIS 32 P.O.), Mo.

▲† **United-Mack (United Builders, Inc., & Mack Constr. Co.)**, 1500 N. Kickapoo St., Box 3020, Shawnee, Okla., LB $3,441,889, (3 bidders), 210 unit CAPEHART HOUSING, Minot Air Force Base MINOT, N. D. Base Procurement Office, Minot Air Force Base, Minot, N. D. Cushing, Servis, Van Doren & Hazard, 2910 Topeka Blvd., Topeka, Kan., archts. BA 3/30/61. CD 3/2/61, under Airports.

▲† **Cedric Saunders**, 115 E. St. Andrew Place, Santa Ana, Calif., LB $3,397,812, completion constr CAPEHART HOUSING, Hayes Proj., Ellsworth Air Force Base, ENG-39-601-61-60, RAPID CITY, S. D. Base Procurement Office, Ellsworth Air Force Base, Rapid City, S. D. BA 4/12/61. CD 3/14/61.

▲ **Julian Barry**, Life Bldg., and **T. C. Bateson**, 6800 Denton Rd., both Dallas, Tex., CA $3,000,000, 12 story, 178,000 sq. ft., masonry APARTMENT, underground parking, swimming pool, DALLAS, TEX. Ainsle Perrault, Wm. H. Morris & Jack Kelley, c/o contractors. Kelley & Marshall, 211 E. 15th St., Tulsa, Okla., archts.

▲ **Manhattan Constr. Co.**, 1811 Crawford St., Houston, Tex., CA $3,250,000, REMODELING White Plaza Hotel into OFFICE, masonry, HOUSTON, TEX. Ed. F. Aycock, c/o general contractor.

## FAR WEST

### HEAVY CONSTRUCTION—BA

▲† **California**—BA 5/5—U. S. Eng., 751 S. Figueroa St., Los Angeles, IMPRV. Centinela Creek Channel, Jefferson Blvd. to Ballona Creek, Los Angeles and Culver City, CIVENG-04-353-61-23. $3,500,000. CD 9/20/60.

▲† **Ariz., Tucson**—BA 5/16—Director, Titan II Construction, Corps Engineers, Ballistic Missile Construction Office, Air Force Unit Post Office, Los Angeles, Calif., TITAN II, Phase II, work incl. CONCRETE, EARTHWORK, PAVING, etc., Davis-Monthan Air Force Base, ENG-04-548-61-34B. CD 4/27/60.

### BUILDINGS—BA

▲ **Utah, Salt Lake City**—BA 5/4—Granite School Dist., 3250 E. 3760 S, Salt Lake City, 235,000 sq. ft. Skyline HIGH SCHOOL. $3,200,000. Plans deposit $100. Dean L. Gustauson Assoc., 15 N. West Temple, archts. CD 4/14/61, under LB.

▲ **Wash., Seattle**—BA 5/9—Seattle University, Broadway and Madison St., 7 story, 40 x 275 ft. RESIDENCE HALL, 1 story, bsmnt, 117 x 153 ft. FOOD SERVICE BLDG., $2,500,000. Plans deposit $50. J. A. Maloney, Central Bldg., archt. CD 11/8/60.

▲ **Wash., Seattle**—BA 5/11—University of Washington, 15th Ave. N. E. and E. 40th St., Zone 5, 6 story, bsmnt, 54,000 ft. rein.-con. frame LIBRARY ADDNS., 51,000 sq. ft. LIBRARY ALTERATIONS, $3,000,000. Plans deposit $75. Bindon & Wright, Norton Bldg., archts. CD 1/21/60.

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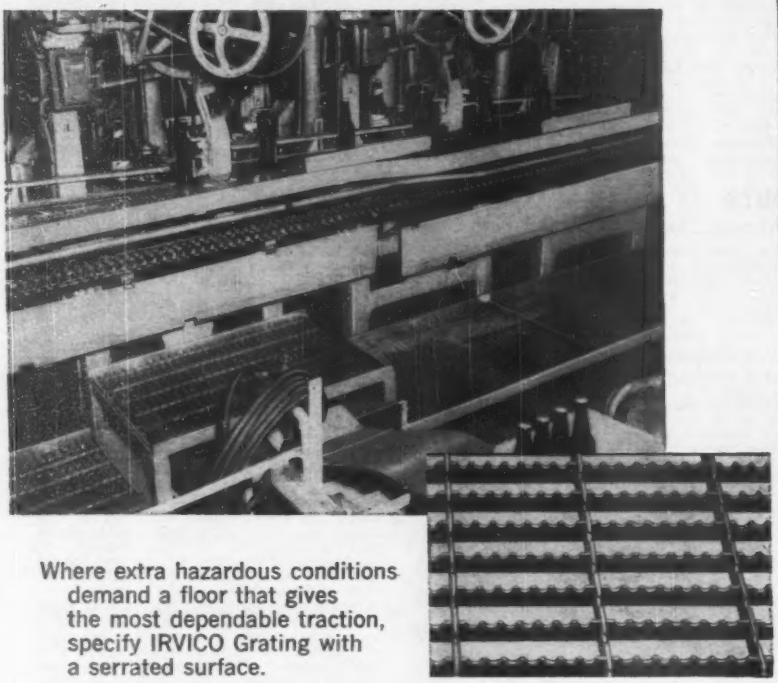

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▲ **Calif., Los Angeles**—BA 5/12—Bd. Educ., 1425 S. San Pedro St., Chas. Drew JUNIOR HIGH SCHOOL, Firestone and Compton Blvds. $2,700,000. Roy Donley, 8320 Melrose Ave., archt. CD 2/4/60.

### HEAVY CONSTRUCTION—LB & CA

▲ **Gunderson Bros.**, 4700 NW Front Ave., Portland, Ore., CA. Est. **$5,083,000**, FLOATING DRY DOCK, PORTLAND, ORE. Port of Portland, Swan Island, Portland, Ore. CD 4/7/61, under LB.

▲ **CALIFORNIA**—State Div. Hy., 1120 N St., Sacramento, BRIDGE,
**Guy F. Atkinson Co.**, 10 West Orange Ave., South San Francisco, Calif., CA **$2,634,040**, substructure 1,500 ft. toll bridge connecting San Pedro and Terminal Island, Los Angeles Harbor, Los Angeles Co. BA 3/22. CD 3/24/61, under LB.

▲ **CALIFORNIA**—State Div. Hys., 120 South Spring St., Los Angeles, ROAD,
**Fredericksen & Kasler**, 213 13 St., Sacramento, Calif., and **Gordon H. Ball**, 300 Camille Ave., Danville, Calif., CA **$7,946,638**, grading, paving 5.2 mi. six lane freeway on US Hy. 70-99 between Colton Ave. and 0.9 mi. east of Wabash Ave., San Bernardino Co. BA 3/30. CD 4/4/61, under LB.

▲ **CALIFORNIA**—State Div. Hys., 1120 N St., Sacramento, BRIDGE,
**Kaiser Steel Corp.**, 7301 Telegraph Rd., Montebello, Calif., CA **$11,374,000**, superstructure 6,010 ft. San Pedro Terminal Island Toll Bridge over Main Channel, Los Angeles Harbor, Los Angeles Co. BA 3/23. CD 3/27/61, under LB.

### BUILDINGS—LB & CA

▲ **Christensen & Lyons Co.**, 50 Hegenberger Loop, Oakland, Calif., CA **$3,000,000**, 2 story, bsmnt., 7,500 sq. ft., rein.-con. TOLL BLDG., site work, utilities, Shavers St. near Fourth, SAN RAFAEL, CALIF. Pacific Telephone & Telegraph Co., 177 Post St., San Francisco, Calif. Clarence O. Peterson, 116 New Montgomery St., San Francisco, Calif., archt. Harry A. Cox, 166 Geary St., San Francisco, Calif., engr.

## CANADA

### BUILDINGS—SLC

▲ **Que., Montreal**—Ruby Foo's Enterprises Ltd., 7815 Decarie Blvd., soon lets contract four 2 story MOTEL BLDGS. $2,000,000. Roth & Ronar, 1407 Mountain St., archts. Backler & Horvath, 5253 Decarie Blvd., engrs. CD 10/17/60.

### HEAVY CONSTRUCTION—LB & CA

▲ **Commonwealth Constr. Co., Ltd.**, 300 Royal Bank Bldg. Winnipeg, Man., CA **$8,033,409**, AIR TERMINAL BLDG., Winnipeg International Airport, WINNIPEG, MAN. Dpt. Transport, Hunter Bldg., Ottawa, Ont. BA 11/25/60. CD 12/2/60, under LB.

▲ **Perini Ltd.**, 49 Jackes St., Toronto, Ont., CA Approx. **$4,000,000**, 5 mi. EARTH DYKE, Ontario Hydro's Little Long power development, 42 mi. north of Kapuskasing on the Mattagami River, extending 2 mi. west and about 3 mi. east of river bank, concrete main dam, powerhouse, control structure for Adam Creek diversion, containing waters of the Mattagami to form headpond area, top dyke will be used as permanent access road, ONTARIO. The Hydro-Electric Power Comm. of Ontario, 620 University Ave., Toronto, Ont. CD 10/11/60.

### BUILDINGS—LB & CA

▲ **J. E. Copeland Co., Ltd.**, 745 Montreal Rd., Ottawa, Ont., Owner Builds, **$6,000,000**, 400 HOMES, SHOPPING CENTER, Helen St., SMITHS FALLS, ONT.

▲ **Ellis-Don Ltd.**, Box 852, London, Ont., LB **$2,991,717** (14 bidders), MENTAL HOSPITAL, incl. 1 story cottages and 2 story wings and 2 story admin. bldg., OWEN SOUND, ONT. Ontario Dpt. P. Wks., Parliament Bldgs., Queens Park, Toronto, Ont. BA 4/12/61. CD 3/22/61.

## LATIN AMERICA

### BUILDINGS—LB & CA

▲ **Ralph M. Parsons Co.**, 617 W. Seventh St., Los Angeles 17, Calif., U.S.A., CA Est. **$10,000,000**, 5,000 bbl. per day REFINERY, near MANAGUA, NICARAGUA. Esso Standard Oil Co., 15 W. 51st St., New York, N. Y., U.S.A.

# PROPOSED PROJECTS

## WATER SUPPLY

▲ **Colo., Boulder**—City, City Hall, voted $4,000,000 bonds Apr. 4, WATER SYSTEM. CD 10/5/60.

▲ **Pa., Phila.**—Dpt. Procurement, City Hall Annex, reconstr. Belmont WATER FILTER PLANT. **$8,500,000**. Morris Knowles, Inc., 351 5th Ave., Pittsburgh, consult. engr. Bids June 1961. CD 11/8/58.

## SEWERS, WASTE DISPOSAL

▲ **Calif., Los Angeles**—City, City Hall, voted **$46,000,000** bonds Apr. 4, six year SANITARY SEWER PROGRAM. CD 1/5/61.

▲ **Ga., Atlanta**—City, City Hall, plans by Robert & Co. Assocs., 96 Poplar St. N. W., 3 unit, 750 ton INCINERATOR, $3,000,000.

▲ **Ind., Indianapolis**—Bd. Sanitary Comrs., 421 N. Pennsylvania Ave.,
INTERCEPTOR SEWER, 11 mi. interceptor sewer, East Marion Co. interceptor, from E. 38th and Post Sts., east to halfway between Mitthoefer and German Church Rds., south along Grassey Creek to 10th St., southwest to Franklin Rd. and US 40, and northwest to 9th and Pleasant Run Parkway, **$3,405,000.**
BELMONT INTERCEPTOR SEWER, north branch from W. 42nd and Copper Sts., northeast along Crooked Creek to 79th and Lieber Sts., **$1,475,000.**
INTERCEPTOR SEWER, extending Bean Creek interceptor sewer from Oxford and Walker Sts., along Bean Creek to Raymond and Sherman Sts., **$169,000.** Bids in Fall 1961.

## BRIDGES

▲ **NORTH CAROLINA**—State Hy. Comn., State Bldg., Ralegih, BRIDGE,
**New Hanover Co.**—bridge over Cape Fear River at Wilmington, **$10,000,000.** C. W. Lee, c/o owner ch. engr. Bids early 1962.

## STREETS AND ROADS

▲ **PENNSYLVANIA**—State Hy. Dpt., 506 North Office Bldg., Harrisburg, ROAD,
**Mercer and Venango Counties**—10 mi. sect. Keystone Shortway (Interstate 80) between proposed interchange with Pittsburgh-Erie Expressway, (Interstate 79) near T. R. 58 and intersection with T. R. 8 between Wesley and Barkeyville, **$10,000,000.** Capitol Engineering Corp., Dillsburg, Pa., consult. engrs. CD 7/23/58.

## EARTHWORK, WATERWAYS

▲ **Alaska, Fairbanks**—Chatanika Power Co., Inc., 653 10 St., EARTHFILL DAM, 130 ft. high, Chatanika River, incl. 15,000 kw POWER PLANT. **$8,000,000.** CD 7/18/60.
▲† **Michigan**—U. S. Eng., 1101 Washington Blvd., Detroit, Zone 26, DREDGING, Lake St. Clair and S.E. Bend Cut-off, CIVENG-20-064-61-63. **$6,000,000.**

## AIRPORTS

▲† **Tex., Wichita Falls**—Base Procurement Office, Sheppard Air Force Base, Wichita Falls, plans by Carter & Burgess, 1100 Macon St., Fort Worth, 290 units, CAPEHART HOUSING, Sheppard Air Force Base, No. 2, **$4,785,000.**

## UNCLASSIFIED

▲ **Calif., Sacramento**—Sacramento-Yolo Port Dist., California Fruit Bldg., 4 and J Sts., voted **$9,850,000** bonds Apr. 4, PORT FACILITIES, incl. relocation of utilities, wharves, transit sheds, grain elevators, rice handling facilities, warehouses, streets, roads and railroad facilities, sanitary and storm sewage facilities. A. F. Benscheidt, 730 East 3 St., Long Beach, Zone 12, consult. engr. CD 1/25/61.
▲ **N. H., Portsmouth**—U.S.A. First Naval Distr., 495 Summer St., Boston, Mass., UTILITY SYSTEM ADDN. and electric power drydock; elevator system addn., Naval Shipyard, NBy 37454. Over **$5,000,000** (no appropriation). Alonzo B. Reed, Inc., 141 Milk St., Boston, Mass., consult. engrs. CD 7/27/60.

## PUBLIC BUILDINGS

▲ **Ala., Auburn**—Auburn University, Auburn, plans by Sherlock, Smith & Adams, 303 Washington Ave., Montgomery, and Pearson, Tittle & Narrows, First National Bank Bldg., Montgomery, 3 story, 200,000 sq. ft. PHYSICAL SCIENCE BLDG. **$3,000,000.** CD 3/14/60.
▲ **Ala., Birmingham**—Birmingham Housing Auth., 600 N 24th St., plans by Charles H. McCauley, 1917 5th Ave. S., 550 units low rent Collegeville HOUSING, Huntsville Rd. **$8,000,000.**
▲† **Calif., Lompoc**—Base Procurement Office, Vandenberg Air Force Base, Lompoc, plans by Hugh Gibbs, 441 E. 1st St., Long Beach, 270 units CAPEHART HOUSING, No. 5, Vandenberg Air Force Base. **$4,455,000.**
▲ **Calif., San Francisco**—State, Div. Beaches & Parks, 1120 N St., Sacramento, plans by William Gladstone Merchant, 57 Post St., and Welton Becket & Assocs., 153 Maiden Lane, 400,000 sq. ft., steel, cast stone PALACE OF FINE ARTS, to incl. 1,500-seat THEATRE, 500-seat THEATRE, 54,000 sq. ft. EXHIBIT HALL, OFFICES, RADIO-TV SOUND STAGES. **$5,800,000.** Ellison Sedgwick & Assocs, 1045 Sansome St., consult. engrs. CD 11/9/59, under City and San Francisco County as owner.
▲† **Ga., Albany**—Base Procurement Office, Turner Air Force Base, plans by James Wise, 873 Spring St. N.W., Atlanta, 260 unit CAPEHART HOUSING, Turner Air Force Base, No. 3. **$4,290,000.**
▲† **Me., Bangor**—Base Procurement Office, Dow Air Force Base, Bangor, plans by Higgins & Webster, 6 State St., Bangor, Me., and Pedersen & Tilney, 155 Whitney Ave., New Haven, Conn., 333 units CAPEHART HOUSING, No. 3, Dow Air Force Base. **$5,494,500.**
▲† **Md., Andrews Air Force Base**—Base Procurement Office, Andrews Air Force Base, plans by Lublin-McGaughy & Assoc., 1300 Connecticut Ave. N. W., Wash., D. C., 300 units CAPEHART HOUSING. **$4,950,000.**
▲† **Mass., Bedford**—Base Procurement Office, Laurence G. Hanscom Field, Bedford, plans by Alonzo B. Reed, Inc., 141 Milk St., Boston, 200 units CAPEHART HOUSING, No. 2, Hanscom Field. **$3,300,000.** CD 12/28/56.
▲ **Mo., Jefferson City**—Bd. Educ., $2,995,000 bond election May 23, SENIOR HIGH SCHOOL, **$2,500,000;** Moreau Heights ELEMENTARY SCHOOL ADDN. Marshall & Brown, 1016 Baltimore, Kansas City, Mo., archts.
▲ **N. H., Durham**—University of New Hampshire, Durham, plans by Perry, Shaw, Hepburn & Dean, 31 St. James Ave., Boston, Mass., PHYSICAL EDUCATION BLDG., **$2,800,000.** Bids July 1961.
▲ **N. J., Vineland**—Bd. Educ., Vineland, plans by Hacker & Hacker, 854 River Rd., New Milford, HIGH SCHOOL, Chestnut Ave. and Brewster Rd. **$3,000,000.** Albert Fentzloff, 111 Broadway, New York 6, N. Y., mech. engr. Beck, Simon & Mantei, 921 Bergen Ave., Jersey City, N. J., struc. engrs. Gustav Weiser, 111 Broadway, New York 6, N. Y., elec. engr. Bids in May. CD 12/17/59.
▲ **N. Y., Little Valley**—Bd. Supervs. Cattaragus County, Court House, plans by Pfohl, Stoll & Roberts, 185 Niagara St., Buffalo 1, N. Y., County CIVIC CENTER to incl. jail, courthouse and county office. **$2,827,000.**
▲ **N. Y., New Rochelle**—City, 515 Main St., plans by Fred W. Lyon, 299 North Ave., New Rochelle, and Knappe & Johnson, 2110 Northern Blvd., Manhasset, converting Junior High School into CITY HALL. **$2,900,000.** Abrams & Moses, 2 Hamilton Ave., mech. engrs. Fromme & Vosganian, 56 W. 45 St., New York, Zone 36, struct. engrs. Bids late April or May. CD 1/5/61.
▲ **N. Y., New York**—Dpt. P. Wks., Municipal Bldg., Zone 7, plans by Katz, Waisman, Blumenkranz, Stein & Weber, 551 5 Ave., Zone 17, and Pomerance & Breines, 630 3 Ave., Zone 17, Proj. HO 145-B, 20 story 1600-bed Bellevue HOSPITAL and reconstr. two existing BLDGS. Total cost **$60,000,000.** Feld & Timoney, 60 E. 23 St., Zone 10, consult. engrs. CD 8/6/59.
▲ **N. Y., Plainedge**—Plainedge Unif. School Dist. No. 18, Hicksville-Massapequa Rd., Bethpage, $3,220,000 referendum May 3, JUNIOR HIGH SCHOOL, Baldwin Dr. **$2,560,000.** Knappe & Johnson, 2110 Northern Blvd., Manhasset, archts. CD 3/27/61.
▲† **O., Dayton**—Base Procurement Office, Wright-Patterson Air Force Base, plans by Robert A. Little and George F. Dalton & Assocs., 1303 Prospect St., Cleveland, 182 unit CAPEHART HOUSING, Wright-Patterson Air Force Base No. 1. **$3,003,000.**
▲ **O., Mansfield**—Bd. Educ., 75 Carpenter Rd., plans by Bellman, Gillett & Richards, 1600 Madison Ave., Toledo, SOUTH HIGH SCHOOL. **$3,000,000.** CD 11/9/59.
▲ **R. I., Warwick**—City, School Bldg. Comn., 1849 Warwick Ave., plans by Castellucci & Galli & Planka, 75 Empire St., Providence, SENIOR HIGH SCHOOL. **$2,950,000.** Bids July 1961. CD 11/28/60.
▲† **S. C., Charleston**—Veterans Admin., Vermont Ave. between H and I Sts. N.W., Wash. 25, D. C., Veterans Administration HOSPITAL, **$12,000,000** (no appropriation). Louis Y. Dawson, Inc., 10 Gillon St., engr. Raymond Concrete Pile Div. Raymond International Inc., 140 Cedar St., New York, N. Y., making test borings.
▲† **S. D., Rapid City**—Base Procurement Office, Ellsworth Air Force Base, plans by Staven Engineering Co., 1703 W. St. Joe St., 500 units, CAPEHART HOUSING, Ellsworth Air Force Base No. 3. **$8,250,000.**
▲† **Utah, Ogden**—General Services Admin., 19 and F Sts. N.W., Wash., D. C., plans by Keith W. Wilcox & Assoc., Kiesel Bldg., Ogden, Utah, FEDERAL OFFICE. **$5,470,000** (no appropriation). CD 2/4/60
▲ **Utah, Salt Lake City**—Utah State Bldg., Bd., 419 State Capitol, plans by Ashton, Evans & Brazier, 24 So. West Temple, Salt Lake City, Utah MEDICAL CENTER for University of Utah. **$10,000,000.** Bids in June for $2,000,000 First Phase.
▲ **Va., Langley Air Force Base**—Base Procurement Office, Langley Air Force Base, Hampton, plans by Lublin-McGaughy & Assoc., 1300 Connecticut Ave. N.W., Wash., D.C., 370 unit CAPEHART HOUSING, Langley Air Force Base No. 2. **$6,105,000.**
▲ **W. Va., New Cumberland**—Bd. Educ., Hancock Co., Courthouse, plans by Kellam & Foley, 1621 W. 1st Ave., Columbus, O., two SENIOR HIGH SCHOOLS, one JUNIOR HIGH SCHOOL. **$5,250,000.**
▲ **Ont., Toronto**—Municipality of Metropolitan Toronto, 67 Adelaide St. E, plans by Marani, Morris & Allan, 1250 Bay St., COURTHOUSE, GARAGE, tunnel to Osgoode Hall. **$13,000,000.**

## COMMERCIAL BUILDINGS

▲ **Ala., Birmingham** — Jefferson Specialties, Inc., subsidiary of Greater Alabama Corp., 611 S. 20th St., plans by Tuggle & Blevin, 108 Grove Ave., S. W., Huntsville, MOTOR HOTEL, 20th St. **$2,500,000.** CD 4/10/61.
▲ **Calif., Hollywood** — Ardmore Development Co., Inc., 7003 Hollywood Blvd., 13 story APARTMENT, southeast corner North Whitley Ave. and Franklin Ave. Over **$5,700,000.** (Correction—owner). CD 4/5/61.
▲ **Calif., Oakland**—1200 Lakeshore, Inc., c/o Simpson, Stratt & Assocs., archts., 325 5 St., San Francisco, 16 story APARTMENT, Lake Merrit. $7,000,000. To go ahead Fall 1961.
▲ **Mass., Brockton**—Gilchrist Co., 417 Washington St., Boston, 1 story DEPARTMENT STORE, Regional


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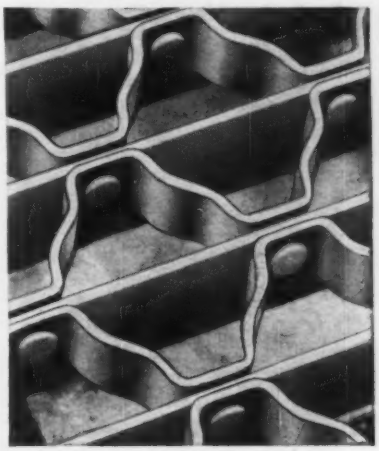

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Shopping Center, Westgate Park, intersection Rtes. 24 and 27. $3,000,000-$4,000,000. Bids Fall 1961.

▲ **Minn., Minneapolis**—Kahler Corp., 20 SW 2nd Ave., Rochester, plans by Urbahn, Brayton & Assocs., 635 Madison Ave., New York, N. Y., Minneapolis Inn Towne MOTEL, swimming pool, Hawthorne Ave. between 10 and 11 Sts. $5,000,000. CD 1/31/61.

▲ **Mo., Lemay (St. Louis 25 P. O.)**—May Co., 601 Olive St., St. Louis, Zone 1, Lemay Center REGIONAL SHOPPING CENTER, incl. 3 level parking areas, access roads, Lemay Ferry, Union and Forder Rds. and Lindbergh Blvd. $10,000,000. Bids 1962 or 1963.

▲ **N. J., New Brunswick**—Johnson & Johnson, 500 George St., plans by John MacWilliam, 495 Main St., Metuchen, 5 story, 142,000 sq. ft., steel frame OFFICE. $5,000,000. Tizian Assocs., 567 Summer Ave., Stamford, Conn., consult. engrs. CD 10/7/60.

▲ **N. J., Princeton**—Princeton Day School Corp., Broadmead, plans by Moore & Hutchins, 800 2nd Ave., New York, N. Y., Middle and Upper SCHOOL, $2,407,000; Lower SCHOOL, Great Rd. $525,000.

▲ **N. Y., New York**—Alta Investing Corp., 119 W. 40 St., Zone 18, plans by Boak & Raad, 175 5 Ave., Zone 10, 19 story APARTMENT, 1569-74 1st Ave. $2,900,000.

▲ **N. Y., New York**—B. F. Bonner, et al, 60 E. 42 St., Zone 17, plans by Boak & Raad, 175 5 Ave., Zone 10, one 19 story, penthouse 295 unit APARTMENT, 1006 1st Ave. between E. 55 and 56 Sts. $5,000,000. Plans changed. CD 3/13/61.

▲ **N. Y., New York**—Columbia University, W. 116 St. and Broadway, Zone 27, plans by Harrison & Abramowitz, 630 5th Ave., New York 20, N. Y., 1 men's DORMITORY; 1 women's DORMITORY, 3 DORMITORIES for Married Students, East Campus, $7,700,000; GRADUATE RESIDENCE HALL, $7,700,000. CD 3/29/56.
plans by Moore & Hutchins, 800 Second Ave., New York 17, N. Y., ARTS CENTER, East Campus, $8,000,000.
plans by Voorhees, Walker, Smith & Haines, 101 Park Ave., New York 17, N. Y., TOWER BLDG. $4,665,000; TERRACE BLDG. for Engineering Center, $3,000,000. Bids Summer 1961. CD 11/20/51.
plans by Moore & Hutchins, 800 Second Ave., New York 17, N. Y., ELECTRONIC COMPUTER CENTER, East Campus, adjacent to Business School. $1,500,000. Bids late 1961. SERVICE BLDG., East Campus adjacent to Business School. $500,000. Bids late 1961.
INTERNATIONAL STUDIES CENTER, East Campus, $8,000,000.
SCHOOL for SOCIAL WORK, Morningside Heights, $3,000,000.

▲ **N. Y., New York**—David W. Frankel, 654 Madison Ave., Zone 21, revised plans by Resnick & Green, 654 Madison Ave., Zone 21, 34 story, 450 unit APARTMENT, 1155-67 1st Ave. between E. 63 and E. 64 Sts. $10,000,000. CD 1/31/61.

▲ **N. Y., New York**—Inwood Gardens, c/o Vermilyea Brown Constr. Co., 100 E. 42 St., Zone 17, plans by Gustave Iser, 95 Madison Ave., Zone 16, 20 story, 218 unit Inwood Gardens APARTMENT, northside Fairview Ave. west of St. Nicholas Ave. $4,059,230. Herbert Klein, 475 5 Ave., Zone 17, mech. engr. Robert Rosenwasser, 375 5 Ave., Zone 16, struct. engr. M. Paul Friedberg, 25 E. 86 St., Zone 28, landscape archt. CD 3/15/61.

▲ **N. Y., New York**—New York University, 100 Washington St., Zone 12, plans by Harrison & Abramowitz, 630 5 Ave., Zone 20, (1) SCHOOL OF EDUCATION, Washington Square Center East, W. 4 St., Green St. and Washington Pl., $4,000,000, (2) CLASSROOM, Washington Square Center, W. 3 St., W. 4 St., $17,000,000. Contr. No. 2 will be built before Contr. 1. CD 4/5/61.

▲ **Tex., Dallas**—First National Bank, 1401 Main St., plans by Geo. L. Dahl, 2101 N. St. Paul St., and Thos. E. Stanley, Turtle Creek Bldg., archt.-engrs., 55 story, BANK and OFFICE, Elm, Field, Pacific, Akard Sts. $27,500,000. CD 1/25/61.

▲ **Tex., San Antonio**—Daniel Gevinson, Developer, The Towers, 77 James St., Syracuse, N. Y., APARTMENT, SWIMMING POOL, $8,500,000.

▲ **Que., Sherbrooke**—Corp. de l'Hotel Dieu Hospital, 580 Bowen St. S., plans by Jean Paul Audet, 1100 Prospect St. and Alphonse Belanger, 46 Vimy St. N., HOSPITAL WING, NURSES RESIDENCE, $3,500,000.

## INDUSTRIAL BUILDINGS

▲ **Fla., Panama City**—Gulf Power Co., 75 N. Pare St., Pensacola, 150,000 kw-STEAM-ELECTRIC GENERATING PLANT, North Bay, near here, $20,000,000.

▲ **Md., Baltimore**—Hearst News Papers, 959 8 Ave., New York, N. Y., plans by Fisher, Nes, Campbell & Assoc., 2120 N. Charles St., Zone 18, 4 story masonry exterior, structural steel frame, concrete floor slabs, NEWS-POST PRINTING PLANT ADDN., ALTERATIONS. $3,000,000. Van R. P. Saxe, 1701 St. Paul St., Zone 2, struct. engr. Egli & Gompf, Inc., 1003 N. Calvert St., Zone 2, mech. engr. Bids late 1961.

▲ **Mass., Westboro**—Home Contractors, Inc., 37 Temple Pl., Boston, 800,000 sq. ft. INDUSTRIAL PARK BLDGS. Approx. $16,000,000. Bay State Engineering Co., 86 Edgecliff Rd., Watertown, consult. engr. Bids about June 15, 1961.

▲ **Tex., Paris**—Campbell Soup Co., 100 Market St., Camden, N. J., 1,000,000 sq. ft. food processing and can manufacturing PLANT, Hy. 286. Over $5,000,000. To go ahead 1961.

▲ **Tex., Sunray**—Shamrock Gas & Oil Corp., 1st Natl. Bank Bldg., Amarillo, 150 ton daily capacity AMMONIA PLANT, $2,500,000.

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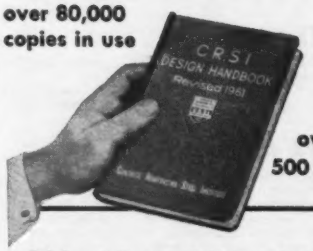


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# Bids—Low Bids—Contracts—Second Section

## NEW ENGLAND

### BUILDINGS—SLC

▲† **Mass., Natick**—Atomic Energy Comn., 376 Hudson St., New York, N. Y., soon lets contract SUBSTRUCTURE for Quartermaster Radiation Laboratory, Inv. NY 48-61-1881. $1,800,000. J. J. Byrnes Assoc. Nucleonics, Inc., 975 Stewart Ave., Garden City, N. Y., archt.-engr. CD 4/12/61.

## MIDDLE ATLANTIC

### BUILDINGS—BA

▲ **Md., Towson**—BA 5/4—Goucher College, Dulaney Valley Rd., Zone 4, (selected list bidders), stone, masonry, steel, concrete COLLEGE CENTER. Pietro Belluschi c/o Massachusetts Institute of Technology, 77 Mass. Ave., Cambridge, Mass., archt. Rogers, Taliaferro & Lamb, 411 N. Charles St., Baltimore, Zone 1, assoc. archts. CD 1/6/58.

▲ **N. Y., Middle Island**—BA 5/5—Central School Dist. No. 12, Brookhaven, Longwood HIGH SCHOOL. $3,200,000. Plans deposit $50. Warren H. Ashley, 726 N. Main St., West Hartford, Conn., archt. CD 1/30/61.

▲ **N. Y., New York**—BA 5/9—New York City Housing Auth., Purchase Div., Rm. 1002, 299 Broadway, Zone 7, Proj. NY-5-32, (1) fdns. and general contract, (2) heating and ventilating, (3) electrical work, (4) plumbing work, Samuel Gompers HOUSES, which includes Buildings 5 and 6, Hamilton Fish Park, Willett St., Delancy St. and Pitt St., Manhattan Boro. $8,864,000, Plans deposit $75; Installing ELEVATORS at Samuel Gompers Houses, Plans deposit $24. CD 10/23/59.

▲ **Pa., Media**—BA 5/11—Riddle Memorial Hospital, 5 W. Front St., Riddle Memorial HOSPITAL. $2,500,000. Extended date. Lawrie & Green, 321 N. Front St., Harrisburg, archts. Edgar T. Clapp, 1930 W. 2nd St., Harrisburg, engr. CD 4/13/61.

### BUILDINGS—SLC

▲ **N. J., Hightstown**—National Lead Co., 111 Broadway, New York, N. Y., soon lets contract RESEARCH LABORATORY. $5,000,000. Ballinger Co., 1625 Race St., Phila., Pa., archts. CD 3/28/61.

▲ **N. Y., Brooklyn**—Brooklyn Savings Bank, Pierpont and Clinton Sts., Zone 1, soon lets contract 4 story BANK and OFFICE, 205-211 Montague St. $2,000,000. Extended date. Carson, Lundin & Shaw, 425 Park Ave., New York 22, N. Y., archts. CD 4/5/61.

### HEAVY CONSTRUCTION—LB & CA

▲† **Buck & Donohue, Inc.**, 60 Park Place, Newark, N. J., CA **$2,785,600**, LEVEES, FLOODWALLS and PUMPING STATION, Lehigh River, Local Flood Protection Proj., near Bethlehem, ENG-36-109-61-17, PENNSYLVANIA. U. S. Eng., 2635 Abbottsford Rd., Phila., Pa. CD 4/11/61, under LB.

▲ **MARYLAND**—State Rds. Comn., 300 W. Preston St., Baltimore, Zone 1, ROAD,
**Wright Contg. Co.**, Odenton, Md., CA **$3,548,267**, roadwork Capitol Beltway from Seven Locks Rd. to Cabin John Bridge, M 512-50-320, Montgomery Co. BA 3/7. CD 3/9/61, under LB.

▲ **McCloskey & Co.**, 1620 W. Thompson St., Phila., Pa., CA **$2,538,196**, North Capitol St. improvements, GRADE SEPARATIONS at Rhode Island Ave. and T Sts., WASH., D. C. D. C. Govt. Dpt. Hys., 299 Pennsylvania Ave. N.W., Wash., D. C. CD 4/13/61, under LB.

### BUILDINGS—LB & CA

▲ **Slattery Contg. Corp.**, 46-36 54 Rd., Maspeth, N. Y., LB **$8,172,000** (8 bidders), Proj. P-426, Contr. 159, general contract underground Lincoln Square GARAGE, bridge, public plaza at Lincoln Center for Performing Arts, Broadway, Amsterdam Ave., W. 62 to W. 65 Sts., Manhattan Boro, NEW YORK, N. Y. Comr. Parks, Arsenal Bldg., Central Park, 64 St. and 5 Ave., New York 21, N. Y. BA 4/19. CD 4/13/61.
**Nager Elec. Co., Inc.**, 426 Broadway, Brooklyn 11, N. Y., LB **$694,000** (9 bidders), Contr. 259, electrical work underground Lincoln Square GARAGE (New York, N. Y.).
**Eugene Duklaver, Inc.**, 6th Ave. between W. 51 and 52 Sts., New York 19, N. Y., LB **$540,000** (8 bidders), Contr. 359, plumbing underground Lincoln Square GARAGE (New York, N. Y.).
**Kerby-Saunders, Inc.**, 307 W. 49 St., New York 19, N. Y., LB **$418,430** (9 bidders), Contr. 459, heating and ventilating underground Lincoln Square GARAGE (New York, N. Y.).

▲ **Skippers Cove**, Box 15, Whippany, N. J., Owner Builds, **$2,000,000**, 250 HOUSES, off Rtes. 512 and 9, WARETOWN, N. J.

▲ **Raymar Homes, Inc.**, 85 Central Ave., Clifton, N. J. Owner Builds, **$2,000,000**, 70 HOUSES, off Bolton Rd., WAYNE, N. J. F. A. Gerritsen, 118 Passaic St., Garfield, N. J., archt. Conger Engineering Assoc., 6-20 Plaza Rd., Fair Lawn, N. J., engrs.

▲ **Dravo Corp., 5th & Liberty Aves.**, Pittsburgh, 22, Pa., CA design and construct basic oxygen steel PLANT, at Farrell Works using Stora Kaldo furnaces, FARRELL, PA. Sharon Steel Corp., S. Irvin Ave., Sharon, Pa. Total Est. **$17,500,000.**
**National Cylinder Gas Division, Chemetron Corp.**, 840 N. Michigan Ave., Chicago, 11, Ill., CA, AIR SEPARATION PLANT to supply oxygen for new basic oxygen steel plant, (Farrell, Pa.).

▲ **Hyman Korman, Inc.**, 6401 Castor Ave., Phila., Pa., Owner Builds, **$5,000,000**, RESIDENTIAL DEVELOPMENT (400) Krewstown Rd. and Welsh Rd., Revere St., PHILA., PA. CD 10/5/59.

▲† **Paul Tishman Co.**, 21 E.70 St., New York, N. Y., LB **$7,737,987**, (15 bidders), BUILDINGS, National Bureau of Standards, GAITHERSBURG, MD. General Services Admin., Rm. 7122, GSA Regional Office Bldg., 7 and D Sts. S.W., Wash., D. C. BA 4/19. CD 3/6/61.

## SOUTH

### BUILDINGS—BA

▲ **Va., Richmond**—BA 5/3—Virginia Employment Comn., Broad-Grace Arcade, OFFICES, 7th between Main and Cary. $2,000,000. Plans deposit $50. Carneal & Johnston, 602 West Cary, archts. CD 10/27/60.

▲ **Ala., Gadsden**—BA 5/18—Baptist Memorial Hospital, 1137 7th Ave., HOSPITAL. $2,400,000. Plans deposit $50. Charles H. McCauley, 1917 5th Ave., S. Birmingham, archt. CD 3/7/61.

▲ **Va., Charlottesville**—BA 6/1—State Dpt. Educ., State Office Bldg., Richmond, LIFE SCIENCE BLDG., University of Virginia. Plans deposit $80. Ballou & Justice, 300 W. Franklin St., Richmond, and Stainback & Scribner, 112 3rd St. N.E., archts. CD 6/15/60.

### BUILDINGS—SLC

▲ **Fla., North Miami**—Ball-Hamilton Corp., 11805 Biscayne Blvd., soon lets contract Sans Souci Manor APARTMENTS, 1900 San Souci Blvd., $2,000,000. M. Tony Sherman, 1700 San Souci Blvd., archt. and engr. William A. Berry, 360 Minorca Ave., Coral Gables, mech. engr. H. J. Bowen, 1191 N.E. 175th St., North Miami Beach, struct. engr.

### HEAVY CONSTRUCTION—LB & CA

▲ **WEST VIRGINIA**—State Rd. Comn., Charleston, Zone 5, ROADS,
**Central Asphalt Paving Co.**, 914 Nelson Bldg., Charleston 1, W. Va., CA **$2,007,530**, c. conc. paving 6.065 mi. Interstate 64 from Sec. 13 to Sec. 19, Proj. I 64-1(47)26, Cabell and Putnam Counties; CA **$1,745,303** c. conc. paving 4.788 mi. Interstate 64 from Sec. 19 to W. Va. 34, Proj. I 64-1(48)30, Putnam Co. BA 4/4/61. CA 4/18/61. CD 4/18/61, under LB.

▲ **WEST VIRGINA**—State Rd. Comn., Charleston 5, Bids Opened 4/18, BRIDGES,
W. Va.—**Allied Structural Steel Co. & Midland Structural Steel Co.**, 20 N. Wacker Dr., Chicago, Ill., LB **$2,225,030**, Contract 1, Kanawha River Bridge No. 2134 over Kanawha River, Interstate 64 near Nitro, Proj. I 64-1(50)43, Putnam Co.;
W. Va.—**M & M Constr. Co.**, Stonewall Sta., Box 6479, Charleston, W. Va., LB **$503,434**, cement concrete paving Martinsville bridge approaches 0.317 mi. Proj. S 47(4), Wetzel Co. CD 4/4/61.

### BUILDINGS—LB & CA

▲ **Pierce A. Peacock**, Mt. Zion Rd., Morrow, Ga., Owner Builds, **$2,500,000**, 167 RESIDENCES, Pinecrest subdivision, JONESBORO, GA.

▲ **Zaret Bldg. Corp.**, 924 Lincoln Rd., Miami Beach, Fla., CA **$3,800,000**, 173 unit APARTMENT, SWIMMING POOL, CABANAS, 5065 Collins Ave., MIAMI BEACH, FLA. Crestview Apartment Co., 940 Lincoln Rd., Miami Beach, Fla. Melvin Grossman, 420 Lincoln Rd., Miami Beach, Fla., archt. Bliss Engineering Co., 4001 Chase Ave., Miami Beach, Fla., engrs.

▲ **Daniel Constr. Co. of Alabama, Inc.**, 822 7th Ave., S. Birmingham, Ala., CA **$2,000,000**, 170,000 sq. ft. containerboard MFG. PLANT and OFFICES, Vanderbilt Rd. near city limits, BIRMINGHAM, ALA. St. Joe Papet Co., Port St. Joe, Fla. Harry H. Payne, c/o Daniel Constr. Co., 492 N. Main St., Greenville, S. C., archt.

## MIDDLE WEST

### BUILDINGS—LB & CA

▲ **Morris Skilken Constr. Co., Inc.**, 696 E. Broad St., Columbus, O., CA **$3,000,000**, design and construct, 12 story, 200 room, HOTEL, 200 car bsmnt. parking, E. Broad St., COLUMBUS, O. Huntington National Bank, trustee of estate, F. W. Schumacher, 17 S. High St., Columbus, O. CA 4/14/61.

▲ **Fluor Corp., Ltd.**, 2500 S. Atlantic Blvd., Los Angeles 22, Calif., CA, design and construct ISOOTYL and DECYL ALCOHOLS PLANT, PORTSMOUTH, O. Oxo Chemicals Co. (Amoco Chemical Co. and Pittsburgh Coke & Chemical Co.) 910 S. Michigan Ave., Chicago, Ill.

▲ **Mesta Machine Co.**, W. Homestead St., Pittsburgh, Pa., CA, galvanizing and aluminum coating SHEET MILL, GARY, IND. United States Steel Corp., 70 Broadway, New York 6, N. Y. CD 11/27/59.

▲ **Mayfair Constr. Co.**, 5660 North Jersey Ave., Chicago, Ill., CA **$2,500,000**, 6 story HOSPITAL ADDN., CHICAGO, ILL. Grant Hospital, 551 West Grant Pl., Chicago, Ill. BA 3/14/61, CA about 4/3/61. CD 4/22/60.

▲ **Borson Constr. Inc.**, 7700 Logan Ave. S., Minneapolis, Minn., CA **$2,032,500**, JUNIOR-SENIOR HIGH SCHOOL, EAU CLAIRE, WIS. Bd. Educ., 118 Mappa St., Eau Claire, Wis. BA 3/15. CD 3/22/61, under LB.

▲ **J. P. Cullen & Son Corp.**, Box 72, Janesville, Wis., CA **$2,317,473**, 2, 6 story, wings, HOSPITAL ADDN., 241-50, MARSHFIELD, WIS. St. Joseph's Hospital, 611 S. St. Joseph St., Marshfield, Wis. BA 3/14/61. CD 3/22/61, under LB;
**J. McClure Kelly & Co.**, 2601 Stevens Ave., Minneapolis, Minn., CA **$1,097,000**, mechanical contract HOSPITAL addn., (Marshfield, Wis.).

▲ **Kutsche & Co.**, 6275 Schaefer Rd., P.O. Box 4085, N.E. Sta., Dearborn, Mich., LB **$2,027,800** (7 bidders), arch. contract HIGH SCHOOL, 11600 E. Seven Mill Rd., DETROIT, MICH. Bd. Educ., 1354 Broadway, Detroit 26, Mich. BA 4/4. CD 3/14/61.
**R. L. Spitzley Heating Co.**, 1200 W. Fort St., Detroit 26, Mich., LB **$597,000** (5 bidders), mechanical contr. HIGH SCHOOL (Detroit, Mich.).

## MISSISSIPPI TO ROCKIES

### BUILDINGS—BA

▲ **Neb., Omaha**—BA 5/4—Omaha Public Power Dist., 803 Electric Bldg., general contract 125,000 kw. FOURTH UNIT NORTH OMAHA STATION, Proj. No. 278. $1,500,000-$2,000,000. Plans deposit $300. Henningson, Durham & Richardson, Inc., 2962 Harney St., Omaha, Neb., and Gibbs & Hill, Inc., 461 8th Ave., New York 1, N. Y., engrs. CD 4/6/61, under LB.

▲ **Tex., Fort Worth**—BA 5/16—Harris Hospital, 1300 W. Cannon St., 4 story, bsmnt, concrete frame, masonry, air-conditioned MATERNITY HOSPITAL, $5,000,000. Plans deposit $50. Preston M. Geren, 1607 Fort Worth Natl. Bldg., archt. CD 9/21/61.

### HEAVY CONSTRUCTION—LB & CA

▲ **NEBRASKA**—Dpt. Rds., State Capitol, Lincoln, Zone 9, ROADS,
**Neb.—Missouri Valley Constr. Co.**, P.O. Box 811, Grand Island, Neb., CA **$545,654**, constr. 13.2 mi. oiled road, Arapahoe-Elwood, grading, 2 bridges, SA base course, AC surface, culverts, etc., Proj. No. F-252 (8), Arapahoe; CA **$830,355**, 8.5 mi. paved road Doniphan-Grand Island, grading, pvmt. culverts, railroad, etc., Proj. No. F-215(3), Hall Co. BA 3/30/61. CD 4/4/61, under LB.;
**Neb.—Abel Constr. Co.**, 1815 Y St., Lincoln, Neb., CA **$1,994,073**, 7.8 mi. paved York-Lincoln Rd., Nos. I-80-8(11) and S-838(2), Lancaster and Seward Counties. Grand total $3,370,082.

▲ **TEXAS**—State Hy. Comn., Austin, Bids opened 4/15, ROADS,
**Tex.—Parker Constr. Co.**, P.O. Box 3506, Odessa, Tex., LB **$339,584**, grading, strs., base and surf. 9.632 mi. Hy. US 62, C 228-2-11, Gaines Co.;
**Tex.—Central Constr. Co., Inc.**, P.O. Box 12216, Dallas, Tex., and **Comewell Constr. Co., Inc.**, P. O. Box 11161, E. Grand Station, Dallas, Tex., LB **$612,263**, grading, strs, fl. base and surf. treatment and railroad separation, 3.593 mi. HY Loop 304, S 2338(2) and (3), Houston Co.;
**Tex.—Austin Bridge Co. & Austin Road Co.**, P.O. Box 1590, Dallas, Tex., LB **$3,104,758**, grading, strs. base, conc. vt. and shldrs., 3.805 mi. Hy. IH 35E, I 35-E-6(89), Dallas Co.;
**Tex.—John F. Buckner & Sons**, Cleburne, Tex., and Texas Bit. Co., P.O. Box 10365, Dallas, Tex., LB **$677,380**, lime treatment, fl. base and A. C. Pvt., 19.649 mi. Hy. US 54, F 608(7), Hartley Co. CD 2/23.

▲ **Sheehan Pipeline Constr. Co.**, Natl. Bank Tulsa Bldg., Tulsa, Okla., CA **$5,318,000**, 363 mi. 4 to 12 in. GAS PIPE LINES, Midland, TEXAS. Transwestern Pipeline Co., 618 First City Natl. Bank Bldg., Houston, Tex. CD 11/30/59.

### BUILDINGS—LB & CA

▲ **Pfaudler Co., Div. of Pfaudler Permutit, Inc.**, 1000 West Ave., Rochester, N. Y., CA Est. **$2,500,000**, 134 steel BEER STORAGE TANKS, ST. LOUIS, MO. Anheuser-Busch, Inc., 721 Pestalozzi St., Louis 18, Mo. CD 12/29/60.

▲ **W. W. Caruth, Jr., Contractor, Developer**, 354 Hillside Village, Dallas, Tex., Owner Builds, **$2,240,000**, 160 DWELLINGS, Williamson-Caruth Terrace Subdivision, N. E. Dallas, DALLAS, TEX.

## FAR WEST

### HEAVY CONSTRUCTION—BA

▲ **California**—BA 5/8—South Sutter Water Dist., P.O. Box 62, East Nicolaus, Camp Far West Proj. (A) EARTHFILL DAM and appurtenances (B) CONVEYANCE CANAL, PROTECTION DIKE, appurtenances near Wheatland, Yuba and Placer Counties. $6,000,000. Extended date. McCreary-Korestsky Engrs., 1140 Howard St., San Francisco, Calif., engrs. CD 4/10/61.

▲† **Washington**—BA 5/17—U. S. Eng., City-County Airport, Walla Walla, first stage constr. LOWER MONUMENTAL LOCK and DAM, CIVENG-45-164-61-458. $3,000,000. CD 4/11/61.

### BUILDINGS—BA

▲ **Calif., Burbank**—BA 5/22—St. Joseph Hospital, 501 S. Buena Vista St., 4 story, rein.-con. HOSPITAL ADDN. $4,000,000. Welton Becket & Assocs., 10000 Santa Monica Blvd., Los Angeles, archts.-engrs. CD 8/24/60.

(Continued on page 76)

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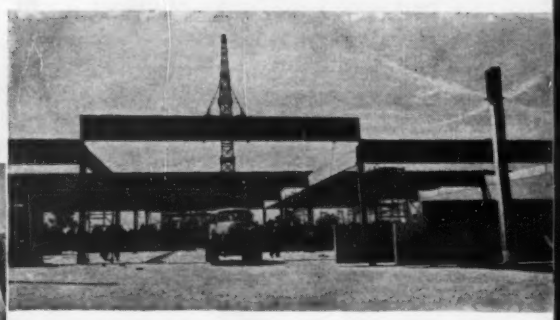

Stressed skin fir plywood roof panels were used in pairs to form peaked roofs over 40 foot bays.

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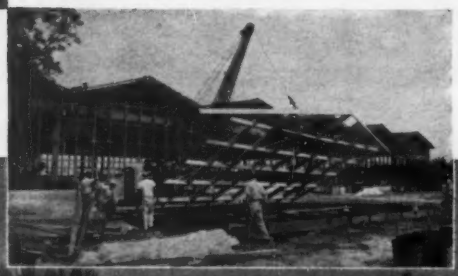

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BUILDERS:
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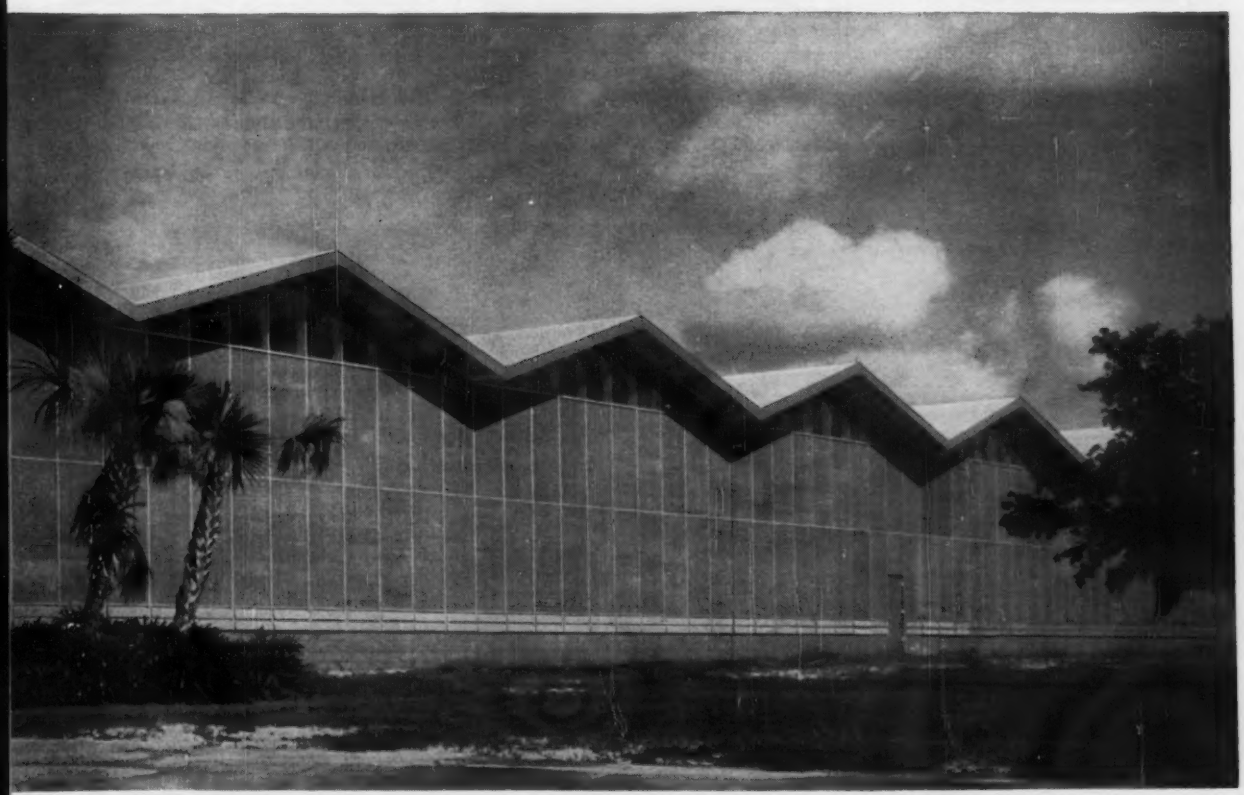
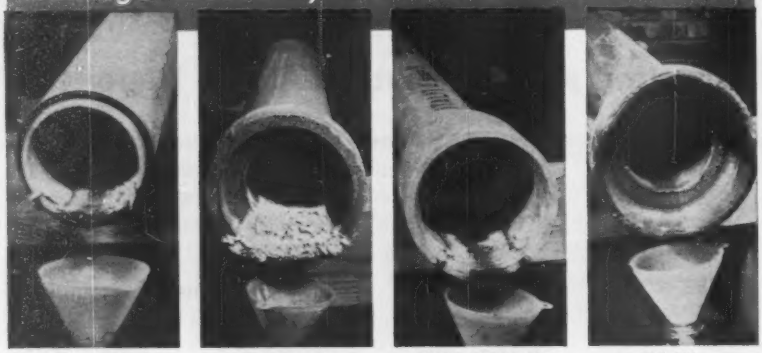


# only CLAY meets the ACID TEST!

*Unretouched photos show corrosion damage caused by the flow of acid solution.*



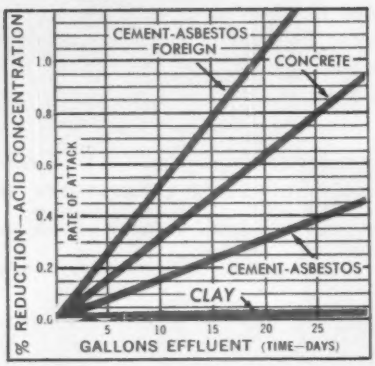
CEMENT-ASBESTOS | CONCRETE | CEMENT-ASBESTOS FOREIGN | CLAY

It's sulphuric acid that destroys sewer lines made of materials bought as substitutes for lifetime Vitrified Clay Pipe. And sulphuric acid—which combines chemically with the binding material in other products to disintegrate them—can't hurt Vitrified Clay, a completely inert material.

Special tests at the Clay Pipe Industry's modern laboratory at Crystal Lake, Illinois, recently illustrated just how damaging this acid concentration can be.

As you can see in these photographs and the chart, the acid started eating up the substitute materials quickly. But it didn't do a thing to lifetime Vitrified Clay.

It's a simple test. Try it yourself before you specify any product for your sanitary sewers other than Vitrified Clay. We just pumped 30 gallons of 8.6 percent sulphuric acid by weight through four different pipe specimens




—in this case, domestic cement-asbestos, concrete, foreign cement-asbestos and clay.

Remember, you can't argue with the facts, and you can't repeal the laws of science. Sewer gas and oxygen are present in all sanitary sewers. And sewer gas and oxygen combined add up to sulphuric acid, which destroys substitutes for Vitrified Clay Pipe.

NATIONAL CLAY PIPE MANUFACTURERS, INC.
1028 Connecticut Ave., Washington, D. C.

Please send me full details on the results of the acid tests on the four sewer pipe materials shown here.

(name)

(company)

(street address)

(city and state)

B-6C23 EN

COMPRESSION SEALED, VITRIFIED
CLAY PIPE
IMPERVIOUS
THE STANDARD in SANITARY SEWERS

NATIONAL CLAY PIPE MANUFACTURERS, INC.
*1028 Connecticut Avenue, N.W.*
*Washington 6, D. C.*


(Continued from page 72)

## HEAVY CONSTRUCTION—LB & CA

▲† **B-E-C-K Constructors**, 3647 Stone Way N., Seattle 3, Wash., LB **$1,948,004**, est. $2,311,540, (16 bidders), TROPOSPHERIC COMMUNICATIONS FACILITIES, Barter Island, Inv. 61-35, Sched. A, Barter Air Force Station, ALASKA. U. S. Eng., P.O. Box 7002, Anchorage, Alaska. BA 4/13. CD 3/23/61, under Alaska, Barter Air Force Station.
**Ghemm Co. Inc.**, Box 787, Fairbanks, Alaska, LB **$1,095,800**, est. $2,593,218 (16 bidders), TROPOSPHERIC COMMUNICATIONS FACILITIES, Inv. 61-35, Sched. B, Fort Yukon Air Force Station (Alaska).

▲ **WASHINGTON** — State Hy. Comn., Transportation Bldg., Olympia, Bids opened 4/18, BRIDGE, **General Constr. Co.**, 3840 Iowa St. and **Manson Constr. & Engineering Co.**, 5209 E. Marginal Way, both of Seattle, Wash., LB **$3,518,500**, (3 bidders), approaches to Second Lake Washington Bridge, King Co. CD 3/15/61.

▲ **OREGON**—State Hy. Comn., Hy. Bldg., Salem, Bids opened 4/11, ROADS,
Ore.—**R. A. Heintz & Rogers Constr. Co.**, 211 N.E. Columbia Blvd., Portland, Ore., CA **$2,408,331** (8 bidders), 12th St. Interchange, Pacific Hy., Jackson Co.;
Ore.—**Warren Northwest, Inc.**, 9860 N.E. Hancock Dr., Portland, Ore., CA **$315,595** (9 bidders), paving 6.97 mi. North Umpqua Rd., Douglas Co. Grand total $3,453,710. BA 4/11/61, CA 4/14/61. CD 3/29/61.

▲ **OREGON**—State Hy. Comn., Hy. Bldg., Salem, BRIDGE,
Ore.—**J. N. Conley & Hannan Bros.**, 8919 SE Foster Rd., Portland, Ore., CA **$2,519,836**, Morrison Bridge Interchange, East Bank Freeway, Proj. I-5-6(17)301, Multnomah Co.;
Ore.—**Peter Kiewit Sons Co.**, Medford, Ore., CA **$1,675,988**, (7 bidders), Jackson St. viaduct, Pacific Hy., Proj. I-5-1(29)27, Jackson Co.;
Ore.—**Pacific Concrete Co.**, 10401 NE Mark St., Portland, Ore., CA **$103,000**, (9 bidders), McAndrews overcrossing, Pacific Hy., Proj. I-5-1(23)28, Jackson Co. Grand total $4,298,824. BA 4/11/61, CA 4/14/61. CD 3/29/61.

## BUILDINGS—LB & CA

▲† **Alcan Pacific Co.**, Box 1551, Anchorage, Alaska, CA **$1,964,503**, est. $1,853,879, FAMILY HOUSING, Big Delta, Inv. 61-25, FORT GREELY, ALASKA. U. S. Eng., P.O. Box 7002, Anchorage, Alaska. BA 3/21. CD 3/30/61, under LB.

▲ **Guy H. Hall**, 310 30th St., Bakersfield, Calif., CA **$2,300,000**, (4 bidders), HIGH SCHOOL between Morning Dr. and Park Dr. south of Pioneer Dr., BAKERSFIELD, CALIF. Kern County Union High School Dist., 2000 24th St., Bakersfield, Calif. Eddy & Paynter, 2901 "H" St., Bakersfield, Calif., archts. BA 4/17, CA 4/17. CD 3/11/60.

▲† **Nomellino Constr. Co. & F. P. Lathrop Constr. Co.**, 939 Marengo Rd., Stockton, Calif., LB **$4,949,000**, (5 bidders), completion CAPEHART HOUSING No. 2, BEALE AIR FORCE BASE, CALIF. Base Procurement Office, Beale Air Force Base, Calif.;
**Harbison & Mahony General Contractors**, 220 Sandburg Dr., Sacramento, Calif., LB **$166,848**, completion of CAPEHART HOUSING No. 1 (Beale Air Force Base, Calif.).

# CANADA

## HEAVY CONSTRUCTION—BA

▲ **Ont., Toronto**—BA 5/9—Municipality of Metropolitan Toronto, 67 Adelaide St. E., DON VALLEY PARKWAY, EXPRESSWAY, incl. grading, paving, lighting, river relocations, Lawrence Ave. interchange ramps, two railway diversions, structural steel underpass bridge, over Don River, twin concrete arch structures under CPR tracks, two concrete pedestrain underpasses. $2,500,000. Plans deposit $100. Fenco-Harris Consulting Engineers, 8 Spadina Rd., engrs. CD 12/9/55.

## HEAVY CONSTRUCTION—LB & CA

▲ **Matthews Concrete Ltd.**, 406 Princess St., London, Ont., CA **$2,344,600**, (12 bidders), SEWERAGE PROJECT, incl. 8 ft. outfall sewer tunnel in two contracts approx. 7,400 ft. and 10,700 ft. In rock, South Bank Ottawa River, OTTAWA, ONT. City, City Hall, Ottawa, Ont. CD 3/6/61.

# PUERTO RICO

## HEAVY CONSTRUCTION—LB & CA

▲ **R. P. Farnsworth & Co., Inc.**, P.O. Box 850, New Orleans, La., U.S.A., CA **$3,918,000**, 20,000 seat SPORTS STADIUM, SAN JUAN, PUERTO RICO. San Juan P. Wks. Dpt., San Juan, Puerto Rico. BA 4/6, CA 4/13. CD 4/13/61, under LB.

## BUILDINGS—LB & CA

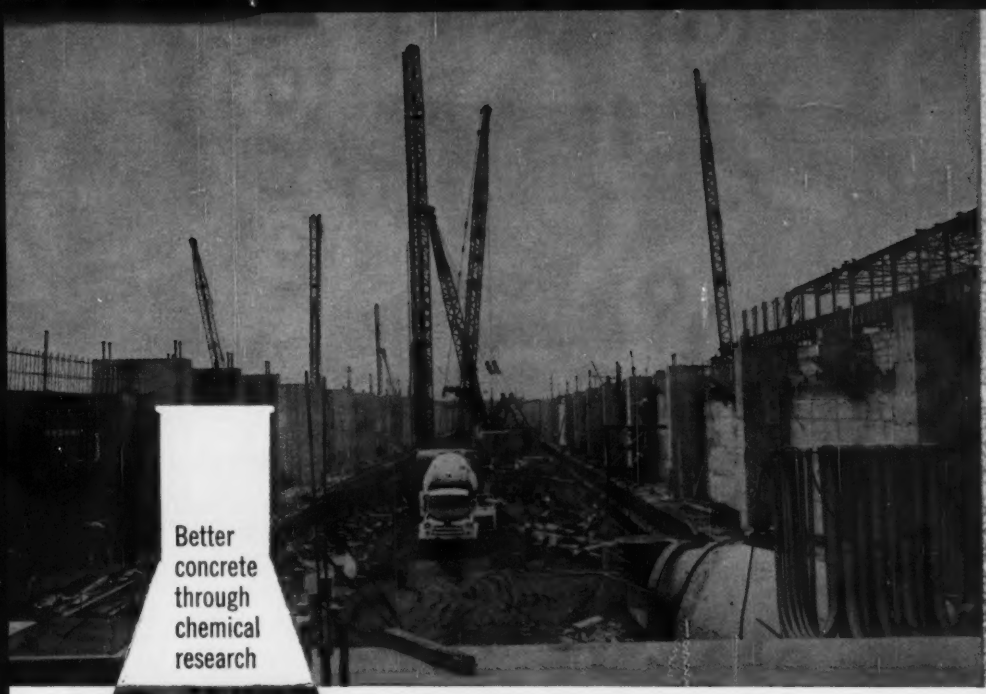
▲ **The Hamilton Co.**, 800 Labra St., San Juan, Puerto Rico, LB **$2,849,000**, 400 unit, rein.-con. HOUSING, 42 buildings, Proj. PR-3-105, RIO PIEDRAS, PUERTO RICO. Puerto Rico Urban Renewal & Housing Admin., P.O. Box 397, Rio Piedras, Puerto Rico. BA 4/12. CD 3/20/61.

# LATIN AMERICA

## BUILDINGS—LB & CA

▲ **Brown & Root, Inc., Contractors**, P.O. Box 3, 4100 Clinton Dr., Houston, Tex., U.S.A., CA **$3,500,000** OIL STORAGE, 10 mi. east of Matamoros, MEXICO. Petroleos Mexicanos (Pemex) Avenida Juarez 92-94, Mexico City, Mexico.

(Proposal Advertisements see pp. 90 to 92)



Better concrete through chemical research

# WRDA

WATER REDUCING AGENT

**on the job at**

## GREAT LAKES STEEL rolling mill

New multimillion dollar Great Lakes Steel "Mill of the Future" takes shape at River Rouge, Michigan. Its length of 2,160 feet and total building area of 880,000 square feet call for over 125,000 cubic yards of high compressive strength concrete produced with blast furnace slag.

Reports of tests made by the Detroit office of Pittsburgh Testing Laboratory indicate a consistent strength level well above specified limits. Controlled water reduction with WRDA, Dewey and Almy's research-perfected chemical admixture was largely responsible for this result. WRDA increased finishing ease and boosted compressive strengths at maximum economy consistent with specifications. Another Dewey and Almy admixture, DAREX AEA, was specified for controlled air entrainment of concrete.

SPONSOR: Great Lakes Steel Corp., Division of National Steel Corp.; ENGINEERS AND CONSULTANTS: United Engineering and Foundry Company, Pittsburgh; CONTRACTOR: Eichleay-Walsh Companies, New York and Pittsburgh; READY MIX SUPPLIER: Winkworth Fuel and Supply Co., River Rouge, Mich.; ADMIXTURE SALES & TECHNICAL SERVICE: J-W Materials, Inc., Napoleon, Ohio

## DEWEY AND ALMY

### CHEMICAL ADMIXTURES FOR CONCRETE CONTROL

Research Perfected—Proved in Use

**DAREX AEA**

provides controlled air entrainment, greater durability.

**WRDA**

controls water content.

**DARATARD**

controls retardation of initial set.

W. R. GRACE & CO.

GRACE

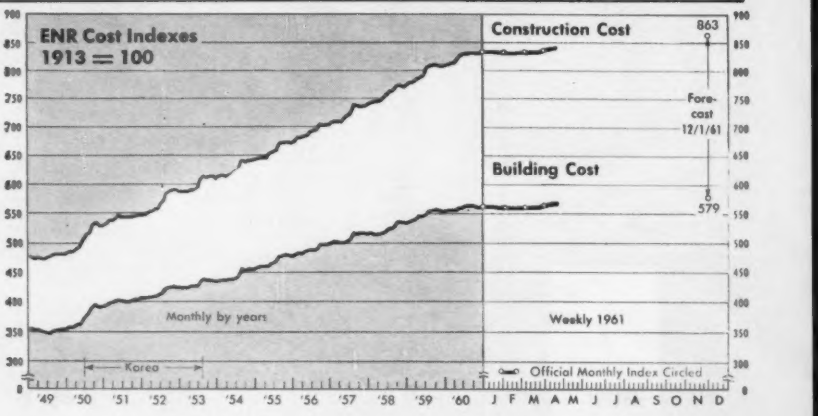
DEWEY AND ALMY CHEMICAL DIVISION

Cambridge 40, Mass.
Chicago 38, Illinois
San Leandro, Calif.
Montreal 32, Canada

See our Catalog 9/DE in Sweet's Architectural File

# Construction Scoreboard

## This Week . . .




| ENR INDEXES (1913=100), 20-cities' average | Week of Apr. 20 1961 | % Change from Mar. 23 1961 | % Change from Apr. 21 1960 |
|---|---|---|---|
| Construction Cost | 840.21 | +0.7 | +3.1 |
| Building Cost | 567.56 | +0.7 | +2.0 |

To convert above indexes to 1926 = 100: Divide Construction Cost by 2.080; Building Cost by 1.850.
1949 = 100: Divide Construction Cost by 4.770; Building Cost by 3.518.

### AMOUNT OF CONTRACTS LET

| Contracts Awarded In 50 States By Type | This Week millions | Cum. 17 wks 1961 millions | Chge '60-'61 % |
|---|---|---|---|
| **All Heavy Construction** | $555.0 | $6,749.1 | + 1 |
| **By Ownership** | | | |
| PRIVATE | 259.5 | 3,363.4 | − 7 |
| PUBLIC | 295.5 | 3,385.7 | +11 |
| State & Municipal | 212.0 | 2,598.6 | +11 |
| Federal | 83.5 | 787.1 | +10 |
| **By Type of Work** | | | |
| PUBLIC | | | |
| Waterworks | 8.0 | 131.0 | −13 |
| Sewerage | 12.8 | 229.3 | +29 |
| Bridges* | 14.4 | 190.5 | −40 |
| Highways | 116.2 | 1,174.7 | +30 |
| Earthwork, Dams & Waterways | 55.9 | 264.4 | +23 |
| Buildings: | | | |
| Excl. Housing | 45.3 | 768.0 | +11 |
| Housing | 16.4 | 234.0 | +44 |
| Unclassified | 26.5 | 393.9 | − 8 |
| PRIVATE | | | |
| Buildings: | | | |
| Mass Housing | 79.7 | 1,473.4 | −19 |
| Commercial | 43.6 | 725.5 | + 4 |
| Industrial | 126.3 | 1,021.4 | +32 |
| Unclassified | 9.9 | 143.0 | −56 |

*Includes Private bridge

NOTE Minimum size projects included are: Waterworks and waterways, $53,000; other public works, $88,000; industrial buildings, $110,000; other buildings, $400,000.

### NEW CONSTRUCTION CAPITAL

| | Week of Apr. 20 millions | Cum. 16 wks 1961 millions | Chge '60-'61 % |
|---|---|---|---|
| Corporate Securities | $310.0 | $ 819.1 | − 2 |
| State and Municipal: | | | |
| All Except Housing | 117.7 | 2,018.1 | − 4 |
| Housing | 0 | 22.2 | +63 |
| Federal Loans | 7.8 | 59.0 | + 6 |
| Federal Aid | 0 | 0 | 0 |
| Total Nonfederal | $435.5 | $2,918.4 | − 3 |
| Federal Appropriations: | | | |
| Projects in U. S. | 0 | 1.0 | .... |
| Outside U. S. | 0 | 0 | 0 |
| Total New Capital | $435.5 | $2,919.4 | − 3 |

## Latest Month . . .

### BACKLOG OF PROPOSED HEAVY CONSTRUCTION

| | March 1961 (millions) | Percent Change from last Month | Percent Change from last Year |
|---|---|---|---|
| Total U. S. (ENR reported) | $125,330 | −0.2 | +2.4 |
| By Ownership— | | | |
| Private | 56,340 | +0.2 | +3.9 |
| State & Municipal | 54,736 | −0.3 | +1.9 |
| Federal | 14,254 | −1.3 | −1.1 |
| By Type of Work— | | | |
| Waterworks | 3,055 | +1.4 | +6.1 |
| Sewerage | 4,188 | +0.1 | +7.9 |
| Bridges | 3,289 | −1.4 | −2.9 |
| Highways | 13,578 | −0.2 | −1.9 |
| Earthwork, Dams and Waterways | 12,039 | −0.3 | +0.3 |
| Public Buildings | 22,839 | −0.9 | +3.2 |
| Industrial Buildings | 17,616 | −1.1 | +0.7 |
| Commercial Buildings | 27,978 | +0.7 | +7.0 |
| Unclassified, Private | 10,745* | +0.7 | +1.2 |
| Unclassified, Public | 10,002 | −0.8 | +1.1 |

* Includes Private Bridges, $101 million

### FLOW OF NEW PROJECTS INTO THE BACKLOG

| | 1961 March (millions) | 1961 3-months (millions) | Percent Change from 1960 March | Percent Change from 1960 3-Mos. |
|---|---|---|---|---|
| Total U. S. (ENR reported) | $2,243 | $5,974 | −37 | −19 |
| By Ownership— | | | | |
| Private | 1,403 | 3,448 | −41 | −15 |
| State & Municipal | 702 | 2,290 | −37 | −22 |
| Federal | 138 | 236 | +106 | −44 |
| By Type of Work— | | | | |
| Waterworks | 75 | 278 | +226 | +190 |
| Sewerage | 68 | 211 | +17 | +20 |
| Bridges | 29 | 117 | −17 | +31 |
| Highways | 110 | 358 | −74 | −69 |
| Earthwork, Dams and Waterways | 10 | 17 | +25 | −69 |
| Public Buildings | 532 | 1,372 | − 5 | − 2 |
| Industrial Buildings | 602 | 1,192 | +49 | +32 |
| Commercial: Mass Housing | 335 | 948 | −80 | −56 |
| Other Building | 349 | 1,016 | +30 | +24 |
| Unclassified, Private | 117 | 292 | +139 | +72 |
| Unclassified, Public | 16 | 173 | −77 | −52 |

### FLOW OF PROJECTS OUT OF BACKLOG INTO CONTRACTS

| | | | | |
|---|---|---|---|---|
| Total U. S. (ENR reported) | 904 | 2,614 | −18 | +12 |
| By Ownership— | | | | |
| Private | 305 | 1,070 | −33 | +15 |
| State & Municipal | 385 | 1,110 | −12 | +13 |
| Federal | 214 | 434 | + 4 | 0 |

**OHIO LIFE INSURANCE CO.**

*New Home Office Building in Cincinnati, Ohio*

General Contractors: Frank Messer & Sons, Inc., Cincinnati

Architects: Potter, Tyler, Martin & Roth, Cincinnati

**to the cost-conscious FABRICATOR:**

Fabricators in 14 states have bought $1,500,000 of beam and column work from us since this advertisement first ran . . . **so we're obviously saving them money with this new equipment!** With structural work so competitive, and cost-saving so important — why don't you return this coupon and see how you can save money?

## PROOF of the savings possible with

# INTERNATIONAL STEEL'S *automated* EQUIPMENT

## . . . first in the country!

Ohio Life's new building is the first construction project using International Steel's *automated* production facilities for beam and column work. Savings were effected because the fabrication of beams and columns . . . normally a step-at-a-time process . . . has now become a *single machine-controlled operation!* Precision tolerances never before practical can now be held. *Automation* at International Steel not only means lower prices, but also better products with better service!

**SEND TODAY!** To demonstrate possible savings, send us shop details on a specific job. We'll give you a firm price, with materials laid down on the job. See what your savings can be. Be first in your area to use the cost-cutting advantages of International's *automated* equipment for beam and column production!

Fabricators located outside the area shown on the map below can use International's automated facilities to sell beam and column work at a profit — and still beat competition! Beams and columns fabricated in our plant can be shipped to any job site, taking advantage of the "fabricated in transit" freight rates.



**Gentlemen:**

I am interested in the savings advantages offered by International's automated beam and column production. Please send me complete information as quickly as possible.

NAME.....

TITLE.....

COMPANY.....

ADDRESS.....

CITY.....ZONE.....STATE.....

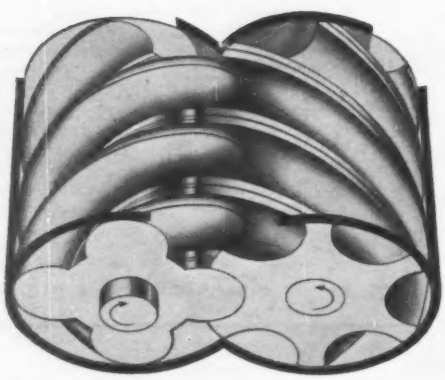
**INTERNATIONAL STEEL COMPANY**

**1647 Edgar Street • Evansville 7, Indiana**

## Here's the world's FIRST single-engine

# 1200 cfm

## portable air compressor



**ADVANCED DESIGN CYCLOIDAL COMPRESSION**

This illustration shows the cycloidal rotor method of compressing air. As the lobes and grooves roll into each other, the mating pockets of air are joined and compressed. This design is similar to that of the Ingersoll-Rand Axi-compressor which has been in use for several years for stationary service. New refinements and design features make it ideally suited for large-capacity portable units.

Now, for the first time, you can meet your requirements for large blocks of air power with a compact, single-engine-driven compressor that's *truly portable.* For Ingersoll-Rand's advanced design 1200-cfm portable is no larger than a 900-cfm unit, and actually weighs 1000 pounds *less!*

Driven by a single General Motors 12V71 diesel engine, this new machine utilizes a compact, light weight cycloidal compressor with only two moving parts. It gives smooth, pulsation-free positive-displacement compression with a new high in capacity per pound of compressor weight.

Ask your Ingersoll-Rand engineer or distributor for complete information.

Ingersoll-Rand®

258A2 ♥ 11 Broadway, New York 4, N. Y.

*THE WORLD'S MOST COMPREHENSIVE COMPRESSOR EXPERIENCE*

# Highway Awards Will Set a Record

State highway department construction contract awards will spurt this year to at least $4.5 billion, slightly above 1958's all-time high of $4.3 billion. Total awards will be up a solid 15% from 1960.

Spending also will be up in three other categories—maintenance, construction equipment and consulting services.

**Highway departments of all 50 states, the District of Columbia and Puerto Rico reported their spending plans for 1961 to ENR in a special survey completed this week.**

**The high level of construction awards reflects the impact of the accelerated federal-aid highway program and the apparent stabilization of the Bureau of Public Roads' contract control procedures.**

Greatest increase will be in contracts on the Interstate system, up 28%. Construction expenditures on the regular (ABC) federal-aid systems will jump 14%.

Only category of spending to drop in 1961 will be construction awards on roads built entirely with state funds, down 17%. Such a drop is probably inevitable, since the states are using more and more local funds to match the accelerated rate of federal spending.

(Please turn the page)

## State Highway Construction Contracting Plans for 1961—By System

| State and Region | Total Planned 1961 | Total Awarded 1960 | Chg. % | Interstate Contracts Planned 1961 | Interstate Contracts Awarded 1960 | Chg. % | ABC Contracts Planned 1961 | ABC Contracts Awarded 1960 | Chg. % | 100% State Financed Planned 1961 | 100% State Financed Awarded 1960 | Chg. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maine | $25,500 | $22,551 | + 13 | $10,000 | $9,150 | + 9 | $14,000 | $10,451 | + 34 | $1,500 | $2,948 | − 49 |
| New Hampshire | 21,300 | 18,000 | + 18 | 10,400 | 7,300 | + 42 | 7,200 | 7,100 | + 1 | 3,700 | 3,600 | + 3 |
| Vermont | 29,200 | 15,145 | + 93 | 22,000 | 9,470 | +132 | 7,000 | 5,132 | + 36 | 200 | 544 | − 63 |
| Massachusetts | 108,000 | 79,487 | + 36 | 37,500 | 37,038 | + 55 | 37,500 | 31,302 | + 20 | 13,000 | 11,147 | + 17 |
| Rhode Island | 23,925 | 16,348 | + 46 | 19,146 | 9,554 | +100 | 3,279 | 5,760 | − 43 | 1,500 | 1,034 | + 45 |
| Connecticut | 54,300 | 24,072 | +126 | 41,700 | 4,691 | +789 | 8,600 | 16,983 | − 61 | 6,000 | 2,398 | +150 |
| NEW ENGLAND | 262,225 | 175,603 | + 49 | 160,746 | 77,203 | +117 | 75,579 | 76,730 | − 2 | 25,900 | 21,671 | + 20 |
| New York | 300,000 | 297,919 | + 1 | 118,000 | 115,994 | + 2 | 120,000 | 111,237 | + 8 | 62,000 | 70,688 | − 12 |
| New Jersey (a) | 115,000 | 51,400 | +124 | 60,000 | 18,000 | +233 | 45,000 | 27,000 | + 67 | 10,000 | 6,400 | + 56 |
| Pennsylvania | 200,000 | 188,700 | + 6 | 100,000 | 112,000 | − 11 | 60,000 | 48,000 | + 25 | 40,000 | 28,700 | + 39 |
| Maryland | 48,000 | 46,903 | + 2 | 19,100 | 17,300 | + 10 | 2,700 | 2,400 | + 13 | 26,200 | 27,203 | − 4 |
| District of Columbia (b) | 51,964 | 28,403 | + 83 | 34,357 | 18,558 | + 85 | 14,677 | 7,811 | + 88 | 2,930 | 2,036 | + 44 |
| Delaware | 25,000 | 4,350 | +475 | 16,000 | 0 | ..... | 7,000 | 1,800 | +289 | 2,000 | 2,550 | − 22 |
| MIDDLE ATLANTIC | 739,964 | 617,675 | + 20 | 347,457 | 281,850 | + 23 | 249,377 | 198,248 | + 26 | 143,130 | 137,577 | + 4 |
| Virginia | 130,000 | 81,033 | + 60 | 81,000 | 51,211 | + 58 | 49,000 | 29,821 | + 64 | 0 | 0 | 0 |
| West Virginia | 49,518 | 27,914 | + 77 | 27,552 | 13,935 | + 98 | 21,967 | 13,980 | + 57 | 0 | 0 | 0 |
| North Carolina | 60,000 | 44,300 | + 35 | 27,000 | 15,700 | + 72 | 30,000 | 24,400 | + 23 | 3,000 | 4,200 | − 29 |
| South Carolina | 51,000 | 48,200 | + 10 | 20,000 | 14,200 | + 41 | 24,000 | 25,000 | − 4 | 9,000 | 9,000 | 0 |
| Georgia | 155,000 | 82,169 | + 89 | 90,000 | 31,809 | + 89 | 45,000 | 36,546 | + 23 | 20,000 | 13,814 | +262 |
| Florida (a) | 100,000 | 92,415 | + 8 | 30,000 | 26,838 | + 12 | 15,000 | 13,564 | + 11 | 55,000 | 52,013 | + 6 |
| Alabama | 90,000 | 92,503 | − 3 | 42,000 | 38,340 | + 10 | 37,000 | 39,834 | − 7 | 11,000 | 14,329 | − 23 |
| Mississippi | 38,004 | 39,681 | − 4 | 21,434 | 23,313 | − 8 | 16,500 | 16,280 | + 1 | 70 | 88 | − 20 |
| Louisiana | 102,000 | 94,972 | + 7 | 50,000 | 44,740 | + 12 | 33,000 | 32,164 | + 3 | 19,000 | 18,059 | + 5 |
| Kentucky | 73,039 | 63,099 | + 16 | 35,818 | 41,389 | − 13 | 28,886 | 12,710 | +127 | 8,335 | 9,000 | − 7 |
| Tennessee | 106,000 | 76,284 | + 39 | 71,000 | 52,395 | + 36 | 25,000 | 16,144 | + 55 | 10,000 | 7,745 | + 29 |
| SOUTH | 956,561 | 742,570 | + 29 | 465,804 | 353,879 | + 32 | 325,353 | 260,443 | + 25 | 165,405 | 128,248 | + 29 |
| Ohio | 200,000 | 215,654 | − 7 | 105,000 | 88,755 | + 18 | 80,000 | 65,593 | + 22 | 15,000 | 61,306 | − 76 |
| Indiana | 95,000 | 94,442 | + 1 | 40,000 | 39,067 | + 2 | 52,000 | 52,645 | − 1 | 3,000 | 2,700 | + 11 |
| Illinois | 215,000 | 227,000 | − 5 | 135,000 | 106,000 | + 27 | 70,000 | 100,000 | − 30 | 10,000 | 21,000 | − 52 |
| Wisconsin | 88,000 | 69,837 | + 26 | 28,000 | 23,182 | + 21 | 40,000 | 27,355 | + 46 | 20,000 | 19,300 | + 4 |
| Michigan | 250,000 | 205,000 | + 22 | 142,000 | 120,000 | + 18 | 102,000 | 79,000 | + 29 | 6,000 | 6,000 | 0 |
| MIDDLE WEST | 848,000 | 811,933 | + 4 | 450,000 | 377,034 | + 19 | 344,000 | 324,593 | + 6 | 54,000 | 110,306 | − 51 |
| Minnesota | 92,000 | 69,000 | + 33 | 48,000 | 18,000 | +167 | 41,000 | 47,000 | − 13 | 3,000 | 4,000 | − 25 |
| Iowa | 86,400 | 84,242 | + 3 | 21,200 | 18,031 | + 18 | 35,200 | 32,570 | + 8 | 30,000 | 33,641 | − 11 |
| Missouri | 142,000 | 141,064 | + 1 | 70,444 | 69,766 | + 1 | 69,557 | 56,601 | + 23 | 2,000 | 14,697 | − 86 |
| Arkansas | 49,150 | 45,382 | + 8 | 24,000 | 21,287 | + 13 | 24,950 | 23,696 | + 5 | 200 | 399 | − 50 |
| North Dakota | 27,100 | 34,400 | − 21 | 9,000 | 10,700 | − 16 | 18,000 | 23,500 | − 23 | 100 | 200 | − 50 |
| South Dakota | 42,850 | 47,280 | − 9 | 24,200 | 21,739 | + 11 | 16,650 | 19,873 | − 16 | 2,000 | 5,668 | − 65 |
| Nebraska | 47,000 | 42,935 | + 9 | 24,000 | 20,180 | + 19 | 23,000 | 16,120 | + 43 | 0 | 6,635 | −100 |
| Kansas | 68,000 | 66,032 | + 3 | 27,000 | 25,960 | + 4 | 35,000 | 33,042 | + 24 | 6,000 | 7,030 | − 15 |
| Oklahoma | 50,000 | 48,750 | + 3 | 21,600 | 20,100 | + 7 | 26,700 | 27,200 | − 2 | 1,700 | 1,450 | + 70 |
| Texas | 245,000 | 245,000 | 0 | 89,000 | 89,000 | 0 | 106,000 | 106,000 | 0 | 50,000 | 50,000 | 0 |
| Montana | 41,000 | 30,302 | + 35 | 22,000 | 13,302 | + 65 | 19,000 | 17,000 | + 12 | 0 | 0 | 0 |
| Wyoming | 48,343 | 35,870 | + 35 | 31,750 | 16,294 | + 95 | 11,443 | 14,824 | − 23 | 5,150 | 4,752 | + 8 |
| Colorado | 46,000 | 43,100 | + 7 | 16,000 | 15,500 | + 3 | 27,500 | 24,900 | + 10 | 2,500 | 2,700 | − 7 |
| New Mexico | 39,500 | 35,346 | + 12 | 20,000 | 12,392 | + 61 | 18,000 | 21,643 | − 17 | 1,500 | 1,311 | + 14 |
| MISSISSIPPI TO ROCKIES | 1,024,343 | 968,703 | + 6 | 448,194 | 372,251 | + 20 | 472,000 | 463,969 | + 2 | 104,150 | 132,483 | − 21 |
| Idaho | 39,900m | 20,402 | + 96 | 22,600m | 9,862 | +129 | 15,800m | 9,548 | + 65 | 1,500 | 991 | + 51 |
| Utah | 43,000 | 23,565 | + 82 | 25,000 | 11,460s | +118 | 13,000 | 8,757s | + 48 | 5,000 | 3,348s | + 49 |
| Arizona | 45,000 | 40,000 | + 13 | 28,000 | 17,000 | + 65 | 13,000 | 13,000 | 0 | 4,000 | 10,000 | − 60 |
| Nevada | 23,000 | 14,000 | + 64 | 16,000 | 5,800 | +176 | 7,000 | 8,200 | − 15 | 6 | 0 | 0 |
| Washington | 63,000 | 58,960 | + 7 | 31,000 | 28,735 | + 8 | 30,000 | 28,079 | + 7 | 2,000 | 2,146 | − 7 |
| Oregon | 55,258 | 60,050 | − 8 | 31,518 | 31,910 | − 1 | 21,250 | 24,970 | − 15 | 2,500 | 3,170 | − 21 |
| California | 328,000 | 347,600 | − 6 | 210,000 | 179,400 | + 17 | 90,000 | 75,000 | + 20 | 28,000 | 93,200 | − 70 |
| Alaska | 36,962 | 6,952p | +432 | .....f | .....f | ..... | 36,000 | 6,414p | +461 | 962 | 538p | + 79 |
| Hawaii | 16,434 | 10,079 | + 63 | .....k | .....f | ..... | 15,612 | 9,613 | + 62 | 822 | 466 | + 76 |
| FAR WEST | 650,554 | 581,608 | + 12 | 364,118 | 284,167 | + 28 | 241,662 | 183,581 | + 32 | 44,784 | 113,859 | − 61 |
| Puerto Rico | 21,700 | 9,400 | +131 | .....f | .....f | ..... | 20,000 | 5,600 | +257 | 1,700 | 3,800 | − 55 |
| UNITED STATES | 4,503,357 | 3,907,492 | +15 | 2,236,319 | 1,746,384 | + 28 | 1,727,971 | 1,513,164 | + 14 | 539,069 | 647,944 | − 17 |

*na Not available *a Fiscal year *b Subject to Congressional appropriation *c Information not furnished *d Subject to legislative appropriation *e Fiscal year ending Aug '61 and Aug '60 *f Has no interstate roads *g Includes heavy equipment: $450,000 in '61; $442,215 in 1960 *h Consulting engineering agreements made on a percentage basis for work to be performed over two or three years *i Resurfacing *j Equipment rentals included in maintenance, which is handled at cost by counties *k Now has 3 IS routes, $12,375,000 apportioned for fiscal '62; con-

Regionally, construction awards will increase sharply in New England, the Middle Atlantic states and the South.

Awards in the South will jump $216 million, up 29% from a year ago. Construction will move into high gear in both Georgia and Virginia, up 89% and 60% respectively from last year. Tennessee and West Virginia also will show notable increases. In the East, Connecticut, Delaware and New Jersey 1961 awards will more than double those of 1960.

The nation's seven largest roadbuilding states (New York, Pennsylvania, Ohio, Illinois, Michigan, Texas and California), already rolling at full speed, will spend almost exactly the same total in 1961 as last year. Nearly all of them, however, have indicated they could speed awards if more federal funds became available (ENR Apr. 13, p. 25).

Rising costs of maintenance are reflected in planned expenditures of more than $900 million for this purpose, up about 13% from a year ago. Maintenance by contract will take a whopping 77% jump, most of which is accounted for by Georgia's plans to let $50 million worth of resurfacing contracts on its rural road system.

New equipment purchases planned by the states will be up about 7%, thus keeping pace with the general trend.

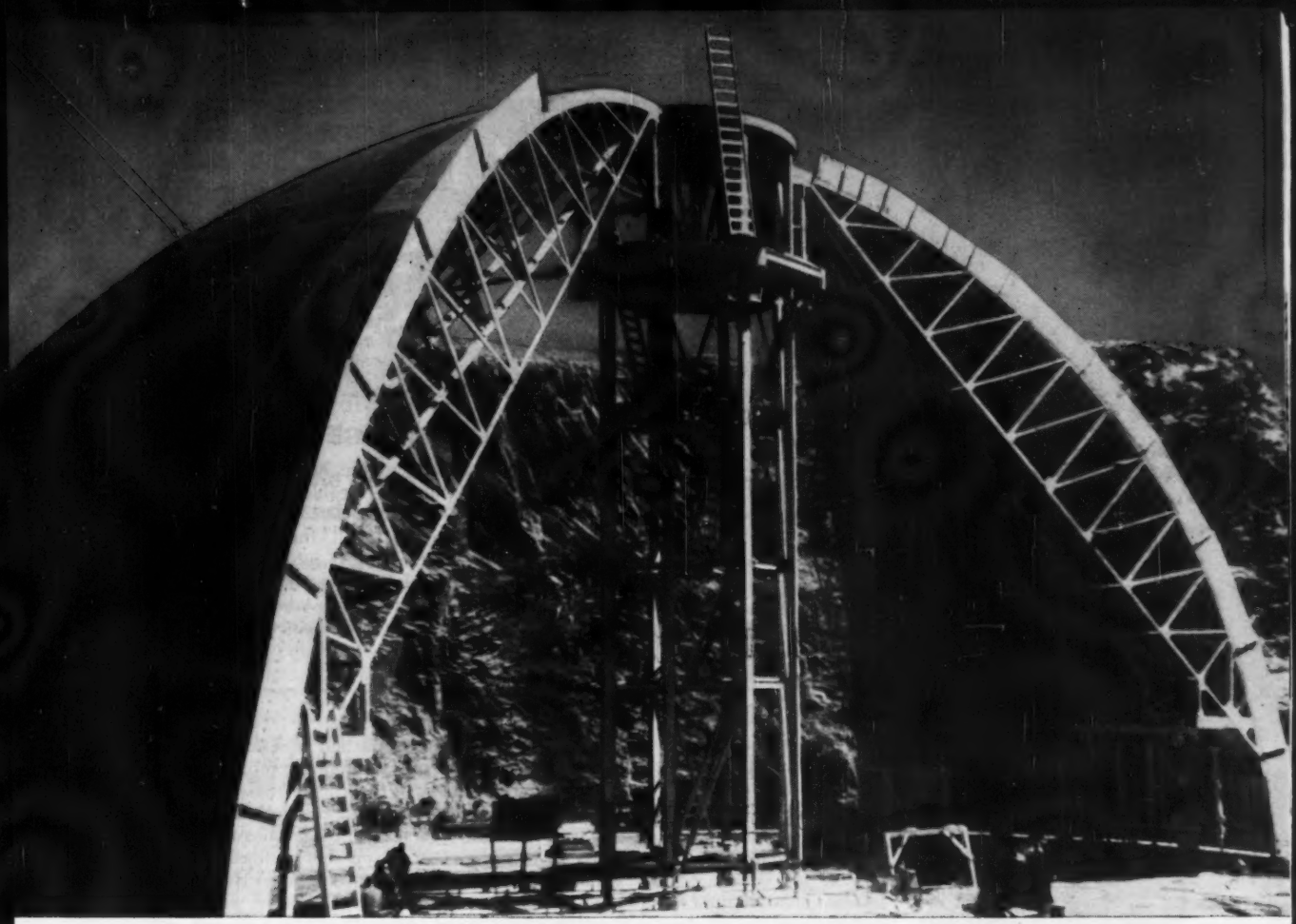
The report shows a modest decrease (1%) across the country in the use of consulting services by the highway departments. Actually, the picture is brighter than it appears, since plans of Pennsylvania, New Jersey, Alabama and Utah are not reported. All buy consulting services. Last year Pennsylvania planned to spend over $10 million for consulting in 1960 (ENR Apr 21, 1960, p. 34).

If the four unreported states spend in 1961 at a rate consistent with 1960, the national total will jump substantially over last year. This will be a sharp reversal of a downward trend that became apparent three years ago.

## State Highway Spending Plans for 1961—Maintenance, Equipment, Consulting

| State and Region | Maintenance: By Own Forces Planned 1961 | By Own Forces Actual 1960 | Chg. % | By Contracts Awarded Planned 1961 | By Contracts Awarded 1960 | Chg. % | New Equipment Purchases Planned 1961 | Purchases Bought 1960 | Chg. % | Consulting Engineering Services Planned 1961 | Services Actual 1960 | Chg. % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Maine | $13,600 | $13,497 | + 1 | $50 | $50 | 0 | $1,100 | $1,040 | + 6 | $300 | $800 | − 62 |
| New Hampshire | 8,800 | 8,018 | + 10 | 1,250 | 1,400 | − 11 | 450 | 485 | − 7 | 600 | 600 | 0 |
| Vermont | 6,000 | 5,865 | + 2 | 400 | 387 | + 3 | 460 | 460 | 0 | 125 | 409 | − 69 |
| Massachusetts | 8,300 | 7,900 | + 5 | 2,100 | 1,850 | + 14 | 320 | 556 | − 46 | 0 | 0 | 0 |
| Rhode Island | 6,000 | 5,509 | + 9 | 0 | 0 | 0 | 150 | 103 | + 46 | 650 | 600 | + 8 |
| Connecticut | 17,400 | 16,200 | + 7 | 300 | 300 | 0 | 1,600 | 762 | +110 | 5,000 | 4,400 | + 36 |
| NEW ENGLAND | 60,100 | 56,989 | + 5 | 4,100 | 3,987 | + 3 | 4,000 | 3,406 | + 19 | 7,675 | 6,809 | + 13 |
| New York | 37,500 | 36,634 | + 2 | 8,000 | 7,235 | + 11 | 2,500 | 2,351 | + 6 | 3,500 | 3,019 | + 16 |
| New Jersey (a) | 16,700 | 16,706 | 0 | 1,400 | 1,400 | 0 | 650 | 650 | 0 | ..... h | ..... h | 0 |
| Pennsylvania | 62,000 | 57,000 | + 9 | 0 | 0 | 0 | 5,100 | 4,300 | + 19 | ..... e | ..... e | |
| Maryland | 10,000 | 8,733 | + 15 | 0 | 0 | 0 | 1,100 | 1,375 | − 20 | 1,800 | 2,200 | − 18 |
| District of Columbia (b) | 1,959 | 2,044 | − 4 | 2,010 | 1,712 | + 17 | 213 | 196 | + 9 | 488 | 7 | +6,871 |
| Delaware | 4,497 | 4,142 | + 9 | 1,500 | 0 | 0 | 107 | 100 | + 7 | 500 | 750 | − 33 |
| MIDDLE ATLANTIC | 132,656 | 125,253 | + 6 | 12,910 | 10,347 | + 25 | 9,690 | 8,972 | + 8 | 6,288 | 5,969 | + 15 |
| Virginia | 31,000 | 29,200 | + 6 | 6,000 | 5,800 | + 3 | 2,000 | 1,597 | + 25 | 725 | 725 | 0 |
| West Virginia | 40,000 | 33,500 | + 20 | 0 | 0 | 0 | 2,250 | 2,153 | + 5 | 4,602 | 1,243 | +270 |
| North Carolina | 51,000 | 49,500 | + 3 | 0 | 0 | 0 | 3,500 | 3,500 | 0 | 125 | 125 | 0 |
| South Carolina | 12,500 | 11,700 | + 7 | 4,000 | 3,800 | + 5 | 1,000 | 1,000 | 0 | 400 | 0 | ..... |
| Georgia | 14,500 | 14,183 | + 2 | 50,000i | 0 | 0 | 1,250 | 1,806 | − 31 | 0 | 0 | 0 |
| Florida (a) | 18,000 | 16,087 | + 12 | 0 | 0 | 0 | 1,200g | 1,335g | − 19 | 1,800 | 1,090 | + 66 |
| Alabama | 9,500 | 9,578 | − 2 | ..... r | ..... r | ..... | 2,000 | 5,287 | − 62 | na | na | |
| Mississippi | 8,000 | 7,841 | + 2 | 0 | 0 | 0 | 1,000 | 801 | + 25 | 15 | 10 | + 50 |
| Louisiana | 19,000 | 18,500 | + 3 | 0 | 0 | 0 | 1,500 | 1,000 | + 50 | 2,500 | 2,200 | + 14 |
| Kentucky | 29,676 | 29,217 | + 2 | 0 | 0 | 0 | 1,500 | 835 | + 80 | 554 | 2,405 | − 77 |
| Tennessee | 12,000 | 10,144 | + 18 | 0 | 0 | 0 | 1,000 | 1,000 | 0 | 0 | 0 | 0 |
| SOUTH | 245,176 | 229,450 | + 7 | 60,000 | 9,600 | +525 | 15,200 | 20,314 | − 10 | 10,723 | 8,398 | + 28 |
| Ohio | 33,000 | 31,500 | + 11 | 2,000 | 2,000 | 0 | 2,000 | 2,500 | − 20 | 7,500 | 5,000 | + 50 |
| Indiana | 5,000 | 5,000 | 0 | 5,000 | 5,000 | 0 | 1,500 | 1,500 | 0 | 3,500 | 3,211 | + 9 |
| Illinois | 35,500 | 30,916 | + 15 | 3,400 | 3,015 | + 13 | 4,400 | 3,097 | − 42 | 4,800 | 4,736 | + 1 |
| Wisconsin | 15,154j | 15,697j | − 3 | 376 | 497 | − 24 | ..... j | ..... j | | 200 | 0 | ..... |
| Michigan | 9,950 | 9,100 | + 9 | 15,500 | 15,300 | + 8 | 1,850 | 1,415 | + 31 | 0 | 3,600 | − 10 |
| MIDDLE WEST | 100,604 | 92,213 | + 9 | 27,276 | 25,812 | + 6 | 9,750 | 8,512 | + 15 | 16,000 | 16,547 | − 3 |
| Minnesota | 13,500 | 13,400 | + 1 | 1,800 | 2,600 | − 31 | 1,700 | 1,500 | + 13 | 1,500 | 700 | +114 |
| Iowa | 11,730 | 12,031 | − 3 | 2,500 | 2,799 | − 7 | 2,812 | 2,030 | + 39 | 815 | 515 | + 58 |
| Missouri | 29,000 | 28,242 | + 3 | 1,100 | 749 | + 47 | 1,450 | 1,094 | + 32 | 1,200 | 1,458 | − 18 |
| Arkansas | 12,500 | 12,240 | + 2 | 6 | 6 | 0 | 1,000 | 834 | + 20 | 75 | 74 | + 1 |
| North Dakota | 4,450 | 4,350 | + 2 | 950 | 1,050 | − 10 | 350 | 540 | − 45 | 50 | 1 | +4,900 |
| South Dakota | 5,000 | 4,918 | + 2 | 700 | 1,167 | − 40 | 1,000 | 750 | + 33 | 0 | 0 | 0 |
| Nebraska | 8,500 | 7,855 | + 8 | 1,000 | 975 | + 3 | 750 | 710 | + 6 | 250 | 700 | − 64 |
| Kansas | 14,650 | 14,548 | + 1 | 2,250 | 2,030 | + 11 | 1,325 | 1,191 | + 11 | 60 | 52 | + 15 |
| Oklahoma | 14,150 | 13,491 | + 5 | 150 | 850 | − 83 | 1,000 | 2,145 | − 53 | 500 | 303 | + 65 |
| Texas | 49,000v | 45,000v | + 9 | 0 | 0 | 0 | 5,200v | 3,800v | + 37 | 0 | 0 | 0 |
| Montana | 6,500 | 6,000 | + 8 | 0 | 0 | 0 | 1,000 | 1,000 | 0 | 600 | 300 | +100 |
| Wyoming | 3,950 | 3,765 | + 5 | 750 | 553 | + 35 | 450 | 432 | + 4 | 15 | 13 | + 15 |
| Colorado | 9,200 | 8,700 | + 6 | 400 | 400 | 0 | 1,000 | 1,000 | 0 | 210 | 110 | + 91 |
| New Mexico | 10,400 | 10,277 | + 1 | 900 | 855 | + 5 | 1,300 | 1,256 | + 4 | 750 | 1,111 | − 32 |
| MISSISSIPPI TO ROCKIES | 192,530 | 184,817 | + 4 | 12,600 | 14,037 | − 10 | 20,337 | 18,282 | + 11 | 6,025 | 5,337 | + 13 |
| Idaho | 7,500 | 7,000 | + 7 | 1,650 | 1,200 | + 38 | 600 | 500 | + 20 | 0 | 0 | 0 |
| Utah | ..... c | ..... c | | ..... c | ..... c | | ..... c | ..... c | | ..... c | ..... c | |
| Arizona | 5,000 | 4,000 | + 25 | 0 | 0 | 0 | 345 | 240 | + 44 | 850 | 1,000 | − 15 |
| Nevada | 4,500 | 4,000 | + 13 | 0 | 0 | 0 | 500 | 600 | − 17 | 100 | 350 | − 71 |
| Washington | 8,113 | 7,375 | + 10 | 3,478 | 3,161 | + 10 | 1,250 | 846 | + 48 | 0 | 0 | 0 |
| Oregon | 12,000 | 11,046 | + 9 | 1,450m | 1,428m | + 2 | 2,000 | 1,861 | + 7 | 0 | 0 | 0 |
| California | 60,500 | 35,515 | + 14 | 1,000 | 845 | + 18 | 4,800 | 4,000 | + 20 | 0 | 0 | 0 |
| Alaska | 6,000 | 2,500q | +140 | 500 | 30 | +1,182 | 1,000d | 0q | 0 | 0 | 3,483 | −100 |
| Hawaii | 1,922 | 2,034 | − 6 | 649 | 828 | − 22 | 40 | 23 | + 74 | 50 | 5 | +900 |
| FAR WEST | 85,535 | 73,470 | + 17 | 8,727 | 7,501 | + 16 | 10,535 | 8,070 | + 31 | 1,000 | 4,838 | − 79 |
| Puerto Rico | 4,800 | 4,700 | − 2 | 500 | 0 | ..... | 250 | 230 | + 9 | 500 | 1,000 | − 50 |
| UNITED STATES | 821,401 | 706,883 | + 7 | 125,113 | 71,286 | + 77 | 72,822 | 67,786 | + 7 | 48,211 | 48,098 | − 1 |

struction to start in '62. [m] "Downward revision may be necessary if complications delay awards" [n] Incl rock production: $1,250,000 in '61; $1,150,000 in '60 [p] After Feb. 15 [q] After Jul. 1 [r] Included in force account total [s] U.S. Bureau of Public Roads data



# Blaw-Knox steel forms speed Mountain Home Air Force Base Titan missile job

## ONLY FOUR POURS NEEDED FOR 125′ DIAMETER CONCRETE DOME

Two opposing steel forms, each a 45° segment, were moved just three times to complete the pouring of concrete for the hemispherical dome for the power house on this new complex being constructed at the Mountain Home Air Force Base, Mountain Home, Idaho. Kaiser-Raymond-Macco-Puget Sound joint venture has the prime contract for this U.S. Army District project, Walla Walla Corps of Engineers, Walla Walla, Washington.

After the 16′ diameter center keystone was poured on top of the umbrella pedestal, the two forms were poured, then lowered by screw jacks and rotated on rubber wheels to the three other positions needed to complete the dome. Both of the inside and outside forms are designed and constructed to a true spherical surface.

Similar Blaw-Knox forms for a 100′ diameter control center dome were used, as were forms for missile silos and terminal silos on the base. Each of the forms were used for several domes and silos and could well be used on other jobs.

All of the forms were made in sections as large as shipping facilities would permit, in order to minimize on-the-job erection time.

Precise engineering and construction for important projects like this, durability, re-useability, plus ease and simplicity of handling are features of Blaw-Knox steel forms for domes, silos, bridges, tunnels, dams or other heavy construction. Call Blaw-Knox steel forms consultation service early in your planning for important engineering help. Blaw-Knox Company, Pittsburgh 38, Pa.

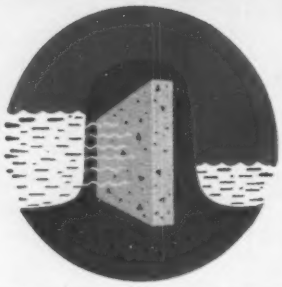
**BLAW-KNOX**

*Steel Forms*

BLAW-KNOX

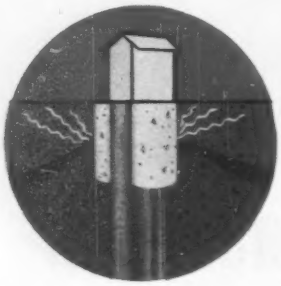
Blaw-Knox designs and manufactures for America's growth industries: METALS: Rolling Mills • Steel Processing Lines • Rolls • Castings • Open Hearth Specialties • PROCESSING: Process Design, Engineering and Plant Construction Services • Process Equipment and Pressure Piping • CONSTRUCTION: Concrete and Bituminous Paving Machines • Concrete Batching Plants and Forms • Gratings • AEROSPACE: Fixed and Steerable Antennas • Radio Telescopes • Towers and Special Structures • POWER: Power Plant Specialties and Valves

# HOW HALLIBURTON GROUTING VERSATILITY SOLVED THESE PROBLEMS



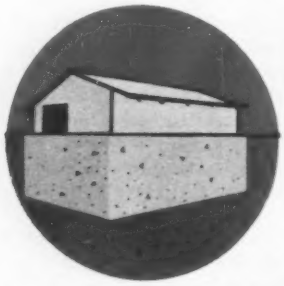
## WATER RESERVOIR LEAKAGE

Irvine, Ky. – A reservoir adjacent to the Kentucky River was losing considerable water through permeable stratum beneath the reservoir dam. SOLUTION: Halliburton Pressure Grouting Service was engaged to build a cutoff "wall" through the permeable stratum. Grouting holes were drilled into the permeable stratum. Halliburton DOC (Diesel Oil Cement) grout was selected because of its ability to set almost immediately when contacted by water. Water leakage from the reservoir was completely halted.



## SALT MINE WATER INTRUSION

Avery Island, La. – The wall of this 15′ x 20′ ventilation and access shaft, 508′ deep, is formed of open salt except for a concrete caisson lining the top thirty feet. Water had dissolved the salt behind the concrete at the caisson base, allowing water intrusion into the shaft. The water was dissolving and eroding the walls all the way to the mine floor. SOLUTION: Halliburton studied the problem and simulated these subsurface conditions for a long series of experimental injection tests prior to presenting a grouting plan for approval. It was decided to inject Halliburton Bloxall chemical grout at unusually low pressures and volumes to effect a water-tight seal between the salt dome and overburden without adversely affecting the salt, and to consolidate the fine water-bearing sand surrounding the shaft. Two concentric perimeters of grouting holes were drilled around the shaft. Pipe was placed in the holes and perforated at carefully selected depths with Halliburton's perforating tool. Accurate injection pressures were maintained at exacting levels by Halliburton's versatile six-plunger grouting pump. Pressure tests and observation after the job determined that the shaft was dry following this treatment and indicated that the surrounding formation was consolidated.



## COMPRESSOR STATION VIBRATION

Wichita, Kan. – Excessive vibration in this compressor station building and surrounding area was apparently being caused by harmonic action of the compressors plus the inability of loose sand underlying the foundation to adequately anchor the structure. SOLUTION: A pattern of grouting holes were drilled through the floor of the building and into the unconsolidated sand formation. Halliburton Chemical grout was selected because it was necessary to actually penetrate the pore spaces of the loose sand. Following the chemical grout placement through perforations, the loose sand was consolidated and tied together, thus eliminating the damaging effects of vibration on equipment and protecting gas lines leading into the building.

CONSULT YOUR HALLIBURTON GROUTING SPECIALIST for more details on helping you solve these and many other difficult problems with the advanced techniques of Halliburton Pressure Grouting Services. He is as near as your phone.

*Halliburton is financially able to perform any size grouting operation as a prime or sub-contractor*

**PRESSURE GROUTING SERVICES**

**Halliburton**
COMPANY • DUNCAN, OKLAHOMA

# NLRB Reversed on Hiring Halls

- **U. S. Supreme Court upsets both the Labor Board's test of hiring hall legality and the remedy it has been using in cases of violations.**
- **The two landmark cases that are all but buried by the court are known throughout the industry as Mountain-Pacific and Brown-Olds.**
- **Result of the court's action is that the Board's effort to force elimination of the closed shop has been substantially thwarted.**

The U. S. Supreme Court has removed some of the restrictions on union hiring halls in the construction industry and has given the AFL-CIO building trades unions a tighter—though not controlling—grip on construction hiring.

**In two major decisions last week, the high court overturned standards under which union hiring halls have been forced to operate for several years. These standards have tended to restrict the system by which the union furnishes manpower to contractors for a particular construction project.**

**What the court said is this: The union hiring hall is a perfectly legal device**—provided it is not used to discriminate against nonunion workers. It is only illegal if there is concrete evidence that such discrimination is practiced in hiring hall procedures.

And, even where there is such evidence, unions and contractors involved in an illegal hiring hall are not always subject to financial penalties—as they have been up to now.

The hiring hall is a common practice, particularly in the construction and maritime industries. The union, in effect, is the employment agency—a central source for skilled workers for the employer who otherwise would be required to scout for workmen in an area that may be new to him. The employer, if he chooses, may negotiate such a hiring arrangement with the union.

While the Taft-Hartley Act permits the hiring hall, the law specifically outlaws the closed shop, where workers must be members of the union before they are hired. Conflicts over the system have arisen where unions are accused of restricting their referrals to union members.

In the Supreme Court's ruling, Justice William O. Douglas—writing for the majority—concedes that "it may be that the very existance of the hiring hall encourages union membership." But, such a system, without substantive proof that it limits hiring to union members, is not subject to local restrictions.

This is the area in dispute in the Supreme Court cases. The National Labor Relations Board, in a series of decisions, had devised rules to apply to hiring hall arrangements. It is these that the court overturned:

- The Brown-Olds rule, in which the board applied a financial penalty to contractors and unions, or both, where they were parties to a discriminatory hiring hall. The penalty was reimbursement of dues and fees collected by the union from employees for a period of six months prior to the charge of an illegal hiring hall.
- The . Mountain-Pacific doctrine, where the Board required that all hiring hall arrangements contain protective clauses proclaiming that nonunion workers would not be discriminated against.

The Mountain-Pacific decision was announced by the Board in April, 1958. It marked the beginning of a major effort to rid the construction industry of the closed shop, which still flourished despite the fact that the Taft-Hartley Act had outlawed it 11 years earlier.

The sting of the Brown-Olds reimbursement remedy made the decision something to be reckoned with. And since then, the industry has been engaged in a major review and revision of its labor contract language on hiring procedures to avoid the pitfalls of the two decisions.

In the first of the new cases, involving the carpenters union and the Mechanical Handling Systems, Inc., the court decided (seven to one) that the reimbursement penalty was improper, though the court conceded that the hiring hall in this case was an illegal closed shop. However, said the majority, there was no evidence that the payments collected from the employees was coerced by the union, and that the Board exceeded its authority by being punitive rather than remedial.

The trouble is that the NLRB had adopted the practice of calling for an across-the-board reimbursement instead of limiting the reimbursement to those employees, if any, who had actually been coerced into union membership because of the hiring procedure used. This deprived the order of the element of restitution—which is the remedial character the law demands—and made it punitive. Under the law, the Board has no power to take punitive action.

The second decision, by a six-to-two vote, concerned a teamster hiring hall arrangement with the California Truckers Association. That plan provided that "casual" employees would be hired on a seniority basis though the contract specifically noted that this would be irrespective of whether the employee was a union member.

The Board found that under this system "it was reasonable to infer" that union members would be given hiring preference, and noted that the arrangement did not contain the stated nondiscriminatory qualifiers that were set up in Mountain-Pacific.

Mr. Douglas, in his majority opinion, said: "We cannot assume that a union conducts its operations in violation of law or that the parties to this contract did not intend to adhere to its express language. Yet we would have to make those assumptions to agree with the Board that it is reasonable to infer the union will act discriminatorily."

Mr. Douglas went on: "It may be that hiring halls need more regulation than the act presently affords." However, the Board's "power . . . is restricted to elimination of discrimination. Since the present agreement contains such a prohibition, the Board is confined to determine whether discrimination has in fact been practiced."

"If hiring halls are to be subjected to regulation that is less selective and more pervasive," Mr. Douglas added, "Congress not the Board is the agency to do it."

# "If steel doesn't prove to be less

Steel cut construction time and costs in the new Kettle Mills Bridge over the Duck River.

# expensive you don't owe me a cent."

## Angus Jessup, Consulting Engineer, Nashville, Tennessee

### Steel cuts cost 10%, construction time 60 days, in short span bridge

The project called for the replacement of the 50-year-old Kettle Mills Bridge over the Duck River in Maury County, Tennessee. The new bridge had to be built to take the pounding of trucks weighing 30,000 to 40,000 pounds, and to withstand the ravages of periodic floods. It called for a 24-foot roadway and four spans, each about 70-feet long. The county wasn't thinking in terms of steel, but Angus Jessup has been designing all types of bridges for 36 years and he had other ideas. "Let me prepare two sets of plans," he said. "If steel doesn't prove to be less expensive you don't owe me a cent."

The bids confirmed Jessup's opinion that steel is the most economical material for short span bridge construction. Compared to the other method of construction, the bid for steel came in at $70,000—over 10% less—and reduced construction time from 150 days to 90 days. And steel delivered the strength and safety they needed to combat the Duck River's floods.

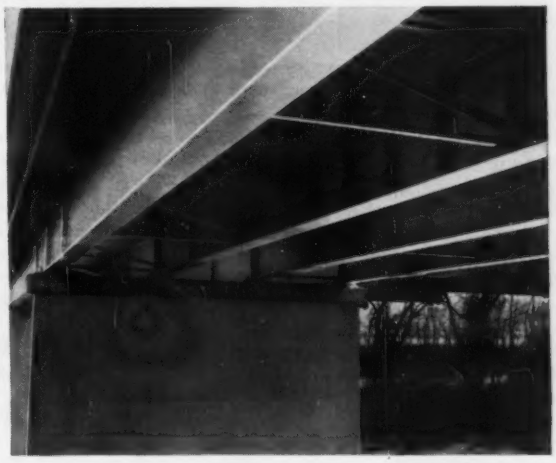
The new bridge uses rolled steel structural sections on the approaches and 36-inch built-up girders in the middle span, a method that is usually found in much longer spans. The type of stream, span lengths, water depth and availability of steel led to Jessup's selection of steel. He says, "We've found that for ordinary spans, steel will usually be more economical, especially where there is flood danger."

You get many exclusive advantages when you design short span bridges in steel, including economy, less construction time, lower foundation costs, greater clearance, and prompt delivery. In addition to the advantages of structural carbon steel, the use of high strength steels and constructional alloy steel can also lead to remarkable savings in both construction and maintenance costs. For full information on USS Structural Shapes and Plates and on the family of USS Steels for Bridges, write United States Steel, 525 William Penn Place, Pittsburgh 30, Pa. USS, MAN-TEN, TRI-TEN and "T-1" are registered trademarks.

Angus Jessup, Consulting Engineer, has been designing bridges for 36 years. During the Thirties he designed nearly all the bridges for the Tennessee Toll Bridge program. His largest project today is the half-mile-long Interstate Highway bridge to span Kentucky Lake between Nashville and Memphis.

This mark tells you a product is made of modern, dependable Steel.

Close-up of the heavy, built-up beams used in the center spans. Lighter, rolled steel structural sections were used in the approaches. Steel was fabricated and erected by Nashville Bridge Company, Nashville, Tenn. General Contractor: Hagen Construction Company.



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# Don't Stockpile Your Labor Disputes

Better labor relations, higher productivity and the possibility of smoother labor contract negotiations are among the dividends that seem to be flowing from a labor-management experiment at International Harvester Co., one of the nation's leading equipment manufacturers.

Under a program started last year, the company and the United Auto Workers Union have been following the proposition that "a stitch in time saves nine" in the handling of labor disputes. They are using a simple system for settling grievances on the spot about as fast as they arise.

Labor-management relations in the company have "drastically changed" as a result. There is much less hostility than before. And there is no longer the stockpile of unsettled disputes that has helped turn every postwar bargaining session into a strike, according to company and union spokesmen.

The program's basic aim of settling labor disputes before they snowball into serious proportions is not new—but it is something that is getting more and more attention.

The National Disputes Plan, which was recently adopted by the National Constructors Association and the AFL-CIO Building and Construction Trades Department, for example, grew out of the same objective, although it operates on quite a different scale. And the long-range labor relations committee at Kaiser Steel Corp. has been stressing the need for quick disposal of labor grievances to prevent the backfire of "an accumulation of unsettled problems."

Details of the Harvester experiment were disclosed in Chicago this month at a meeting of the Associated Employers of Illinois. The program was explained by William J. Reilly, labor relations manager of Harvester, and Arthur D. Shy, head of the UAW's Harvester department.

Key to the program is emphasis on oral handling of complaints and on immediate settlement at the lowest possible level. The handling of grievances in writing is now avoided whenever possible. Most disputes are settled on the spot by the foreman, union steward and the aggrieved employee.

The program has been in operation for nine months. The improvement in labor-management communications has reduced written grievances to a trickle. Only nine grievances remained unsettled as of March 9. Under the old "up the chain of command" system, there were as many as 12,000 grievances awaiting arbitration.

The "new look" got its start in Harvester's Memphis plant in August, 1959, and began functioning on a company-wide basis the following summer. But no one is particularly clear about its origin.

Indications are that some credit is due David Cole, who is the permanent arbitrator for the company and the union and who is a public member of the long-range Kaiser committee. The union, too, seems to be partly responsible because of its earlier efforts to stem the flow of grievances at the Memphis plant by insisting that workers get their "facts" straight before filing written grievances.

In any event, Harvester President Frank Jenks apparently provided the final impetus following the 1958-59 strike. After pondering the question of why there always has to be a strike at negotiation time, he ordered that efforts be made to solve problems as they arise, wherever possible, rather than let them pile up. Plant managers were told to have grievance committees attempt settlements at the lowest possible level and to avoid letting disputes get into written form.

The program that emerged marked a revolution in attitude rather than in machinery. The problems always could have been solved locally if labor and management had not been so antagonistic, Mr. Shy indicated. The filing of grievances and the automatic rejection by management had become a "monster," he said, and locals were actually "running contests to see who could file the most grievances." Management, Mr. Reilly admitted, took the attitude that the union steward "was an irrational person," and that there was "danger in oral handling of grievances and safety in written handling."

"We haven't reached utopia at Harvester," Mr. Shy said, "but the program has worked 99% better than we ever dreamed it might. Our membership endorsed it almost 100%. We didn't have to sell it to the locals—they wanted it."

Harvester and the UAW will begin bargaining on August 1 for a new contract. There is little indication so far as to what effect, if any, the "new look" will have on the negotiations. The record shows that the last three strikes averaged two months. And there is strong evidence that the old mountain of grievances diverted attention from the major bargaining issues and created an atmosphere of bitterness conducive to strikes.

# A New 'Situs' Bill Suggested

The Building Contractors Association of New Jersey has slashed through the confusing verbiage that envelopes the situs picketing bill, and has proposed a direct and simple substitute.

The proposed bill would give a presumption of validity to organizational picketing at construction sites—and thus exempt it from the present boycott ban—on these conditions:

- The picketing must not violate the picketing provisions of the Taft-Hartley and Landrum-Griffin laws.
- The picketing must clearly indicate the employer with whom the dispute exists, it must occur only when that employer or his employees are at the site, and it must be limited to the particular location on the site where they are working.

The proposal was made last week by Paul J. Brienza, managing director of the association, in testimony before the General Subcommittee of Labor of the House Labor Committee. The subcommittee, headed by Rep. Carl D. Perkins (D., Ky.), has been holding hearings on the bill to ease boycott restrictions at construction sites on which more than one contractor is working.

Mr. Brienza took the position that the present bill, H.R. 2955, is a dangerous and unknown quantity.

He said it would foment strikes that the industry and nation can ill afford, harass innocent subcontractors and collide with the separate bid laws in many states.

He dismissed the 10-day cooling off provision for missile strikes as gross callousness because "a concession of any kind in this area would not be in the public interest."

Mr. Brienza contended that the bill is essentially one to make it easier for the building trades to organize. He said this has been true ever since the Denver Building Trades case. But, he argued, the present bill would unnecessarily give construction unions "red carpet organizing opportunities" and "preferential" treatment that would only intensify labor warfare.

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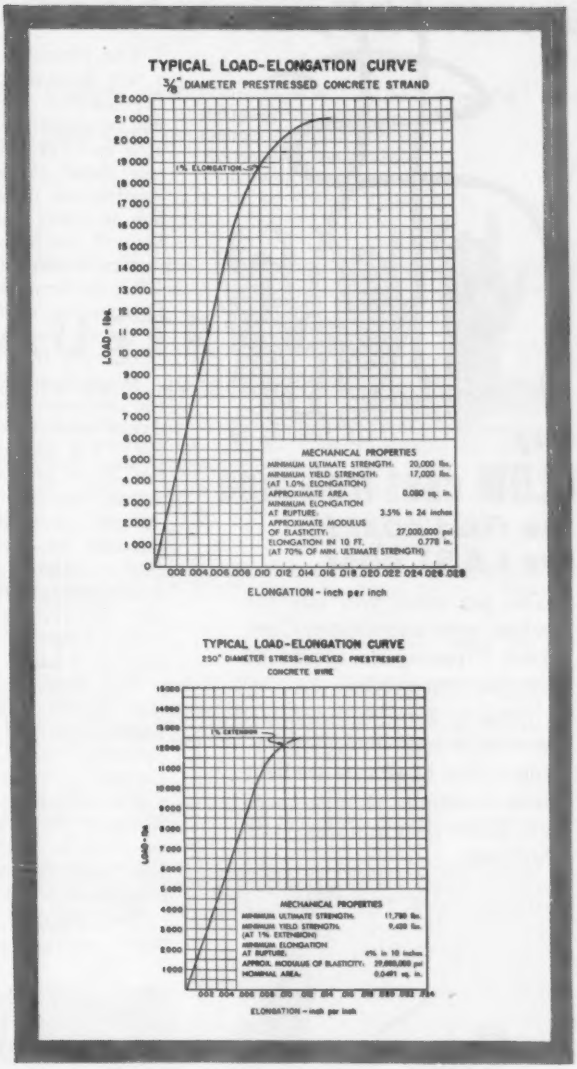
|---|---|---|---|---|
| 1/4 | 122 | .036 | 9,000 | 7,650 |
| 5/16 | 198 | .058 | 14,500 | 12,300 |
| 3/8 | 274 | .080 | 20,000 | 17,000 |
| 7/16 | 373 | .109 | 27,000 | 23,000 |
| 1/2 | 494 | .144 | 36,000 | 30,600 |

Approximate Modulus of Elasticity: 27,000,000 psi.
Minimum Elongation at Rupture: 3.5% in 24″.
Minimum Yield Strength at 1% Elongation: 85% of Ultimate Strength.

**CF&I STRESS-RELIEVED PRESTRESSED CONCRETE WIRE**
**ASTM A-421**
**MECHANICAL PROPERTIES**

| SIZE (Dia.-In.) | AREA (Sq. In.) | WEIGHT (Lbs./100′) | MINIMUM ULTIMATE STRENGTH (PSI) | MINIMUM ULTIMATE STRENGTH (Lbs.) | MINIMUM YIELD STRENGTH (PSI) | MINIMUM YIELD STRENGTH (Lbs.) |
|---|---|---|---|---|---|---|
| 0.276 | .0598 | 203.2 | 235,000 | 14,050 | 188,000 | 11,240 |
| 0.250 | .0491 | 166.7 | 240,000 | 11,780 | 192,000 | 9,430 |
| 0.196 | .0302 | 102.5 | 250,000 | 7,550 | 200,000 | 6,040 |
| 0.192 | .0289 | 98.32 | 250,000 | 7,220 | 200,000 | 5,780 |

Approximate Modulus of Elasticity: 29,000,000 psi.
Minimum Elongation at Rupture: 4% in 10″.
Minimum Yield Strength at 1% Elongation: 80% of Ultimate Strength.


TYPICAL LOAD-ELONGATION CURVE
3/8" DIAMETER PRESTRESSED CONCRETE STRAND
1% ELONGATION
LOAD - lbs.
MECHANICAL PROPERTIES
MINIMUM ULTIMATE STRENGTH: 20,000 lbs.
MINIMUM YIELD STRENGTH: 17,000 lbs.
(AT 1.0% ELONGATION)
APPROXIMATE AREA: 0.080 sq. in.
MINIMUM ELONGATION AT RUPTURE: 3.5% in 24 inches
APPROXIMATE MODULUS OF ELASTICITY: 27,000,000 psi
ELONGATION IN 10 FT. (AT 70% OF MIN. ULTIMATE STRENGTH): 0.778 in.
ELONGATION - inch per inch
TYPICAL LOAD-ELONGATION CURVE
250" DIAMETER STRESS-RELIEVED PRESTRESSED CONCRETE WIRE
1% EXTENSION
LOAD - lbs.
MECHANICAL PROPERTIES
MINIMUM ULTIMATE STRENGTH: 11,780 lbs.
MINIMUM YIELD STRENGTH: 9,430 lbs.
(AT 1% EXTENSION)
MINIMUM ELONGATION AT RUPTURE: 4% in 10 inches
APPROX. MODULUS OF ELASTICITY: 29,000,000 psi
NOMINAL AREA: 0.0491 sq. in.
ELONGATION - inch per inch

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# Labor Sees No Dip in Pay Hikes

The current recession will not have a very depressing effect on 1961 wage negotiations. Pay increases this year will be about the same as those negotiated in 1959 and 1960. They should run about 15 cents an hour in the construction industry and from 3% to 5% in other industries. Fringe benefits will also be liberalized.

That is the prediction of the AFL-CIO. It is made by the federation's Department of Research and appears in the current issue of the AFL-CIO's "Collective Bargaining Report."

Wage demands will be larger than the increases received by unions in recent years, according to the AFL-CIO. The principal reasons it cites are the "usual practice" of making steady annual improvements in wage levels and an "awareness" that sizable wage increases are needed to bolster a sagging economy. It also notes that temporary slumps and unemployment are not very decisive factors in industries "where long-term conditions are fundamentally sound."

The federation's forecast with respect to the construction industry is based in part on past practice and on the trends built in by long-term labor contracts.

The AFL-CIO points out that construction wage increases ranged from five cents to over 20 cents an hour last year, with the bulk of them (68%) falling between 10 and 20 cents.

This year, the federation notes, deferred wage increases for construction workers under previously negotiated long-term contracts will typically run 15 cents or better.

About 600,000 construction workers will get deferred increases this year, it says. Of these, 300,000 will receive increases ranging from 17 to 21 cents an hour. In all, 75% of the 600,000 will get increases of 15 cents or more.

The federation thinks that fringe benefit changes this year will "very likely" parallel those of recent years. It expects the emphasis to be on security. Included in its list of candidates for liberalization are health plans, pensions, vacations and paid holidays.

The AFL-CIO calls wage freezes that have occurred "isolated" instances. It says they appear to be "no more frequent and indeed less common" in this recession period than in the 1949, 1954 and 1958 recessions.

Even if the federation's 1961 predictions are fulfilled, the results will be smaller than the AFL-CIO would like to see. It contends that substantial wage increases "are desperately needed" to build up "consumer demand so that idle men and machines will be put back to work."

Its argument is that 65% of the nation's goods and services are bought by consumers and that 70% of the consumers' buying power comes from wages and salaries. This fact, it argues, makes increases in wages and salaries "the key means of expanding consumer markets and, in turn, national production and employment."

## Labor in Brief . . .

• **Agency shop**—An agency shop clause requiring nonunion workers of a union employer to pay the union that represents them the equivalent of union dues has been ruled illegal in Texas by the state's attorney general. The "service charge" was called tantamount to compulsory membership, which the state right-to-work law forbids.

• **Who is liable?**—Is a construction worker who was injured when he jumped from a scaffold that he thought would collapse when hit by a dump truck responsible for the injuries? The question is before the California Supreme Court on the contractor's appeal of a decision awarding damages to the worker.

• **Strikers win security clause**—Builders in Denver have accepted demands made by striking laborers for the enforcement of a security clause requiring that all laborers join the union within eight days after being hired. The union will pay for any litigation resulting from enforcement of the clause.

• **Situs picketing**—AFL-CIO President George Meany last week gave the federation's full support to the situs picketing bill, which would ease boycott restrictions at construction sites where more than one contractor is working. By letter, he urged the House General Subcommittee on Labor to secure "prompt" enactment of the bill.

# OFFICIAL PROPOSALS

*RATE:* The rate for Official Proposal advertising is $2.70 per line or fraction set solid. Where the advertisement is set other than solid, the space is measured by total space occupied and charged on basis of 12 lines to the inch.

*CLOSING DATE:* Friday 10:30 A.M. for issue dated the following Thursday.
*SEND COPY TO:* Official Proposal Division, Engineering News-Record Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

Bids: July, 1961

### *Invitation for Bids—No. YS-3-6 Synchronous Condenser and Transformers*

Kingdom of Thailand
Royal Irrigation Department
Bangkok, Thailand

The Royal Irrigation Department of the Kingdom of Thailand hereby invites sealed, written bids for furnishing and delivering the following goods, equipment, and materials either fob Contractor's shipping point or cif Bangkok Wharf, Thailand, for the Transmission System, Yanhee Multi-purpose Project, Kingdom of Thailand, in accordance with the Contract Documents:

1) Synchronous condenser, 50/60 mva, 13,800 volts, 3-phase, 50 cycle, hydrogen cooled, outdoor type with excitation control and voltage regulating equipment, complete with all accessories and spare parts
2) Three (3) power transformers, 15,000/20,000 kva, OA/FA rating, single-phase, 50 cycles, outdoor, 69-13 2 kv, complete with tank-mounted lightning arresters, insulating oil, accessories, spare parts, and low voltage taps for "corner of the delta" starting of the synchronous condenser

Invitation for Bids will be issued in April, 1961, and will be opened in July, 1961. Copies of Contract Documents, Invitation for Bids—No. YS-3-6, Synchronous Condenser and Transformers, may be obtained by qualified Bidders on written request to:

Royal Irrigation Department
Attention: Thai Liaison Engineer
c/o Engineering Consultants, Inc.
1901 South Navajo Street
Denver 23, Colorado, U. S. A.

Each request must be accompanied by a check or money order, payable to the Royal Irrigation Department, in the amount of U. S. $20.00 for each copy of the Contract Documents requested. The remittance is nonreturnable.

M. L. Xujati Kambhu
Director General
Royal Irrigation Department
Kingdom of Thailand
Bangkok, Thailand

April 14, 1961

Bids: May 16, 1961

### *Request for Bids for Removal of Bridge*

Sealed proposals will be received at the office of Wm. J. Hedley, Chief Engineer, Wabash Railroad Company, Railway Exchange Building, St. Louis 1, Missouri, until 12:00 Noon (C.S.T.) on the 16th day of May, 1961, for the removal of the entire structure of a double track railroad bridge 330 ft. long, over the Calumet-Sag Channel near Palos Park, Illinois. Plans, specifications and other information concerning this project can be obtained from the office of the Chief Engineer, Wabash Railroad Company, 1551 Railway Exchange Building, St. Louis 1, Missouri, upon payment of $5.00 per set.

## U. S. Government

DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Invitation No. DS-5577) will be received at Denver, Colorado, until 2 p.m., Mountain Standard Time, May 25, 1961, for furnishing eight (8) 13.96-foot by 22.45-foot Fixed-Wheel Gates for Glen Canyon Dam, Colorado River Storage Project, Arizona-Utah. Delivery is desired within 600 days. For particulars, address Bureau of Reclamation, Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

# AUSTRALIA

## SNOWY MOUNTAINS HYDRO-ELECTRIC AUTHORITY

Tenders are invited for Schedule of Rates Contracts for furnishing labour and materials and performing all works for the construction in New South Wales, Australia, of the EUCUMBENE-SNOWY TUNNEL AND APPURTENANT WORKS.

The whole of the works is to be performed under two separate contracts as follows:—

**CONTRACT NO. 20,044** — **EUCUMBENE SECTION OF THE EUCUMBENE-SNOWY TUNNEL AND APPURTENANT WORKS**

This section of the tunnel will be a horseshoe shaped tunnel 20'4" high and 20'8" wide and will be about 36,000 feet long. It will be unlined for a large proportion of its length the remainder being concrete lined.

**CONTRACT NO. 20,045** — **ISLAND BEND SECTION OF THE EUCUMBENE-SNOWY TUNNEL AND APPURTENANT WORKS.**

This section of the tunnel will be a horseshoe shaped tunnel 20'4" high and 20'8" wide and will be about 36,000 feet long. It will be unlined for a large proportion of its length, the remainder being concrete lined. The contract also includes the construction of three 16 foot diameter shafts at Island Bend, two approximately 400 feet deep and one approximately 300 feet deep and a 6 foot diameter steel lined shaft approximately 400 feet deep part way along the tunnel at Burrungubugge River.

**ALTERNATIVE TENDERS**

Tenderers are invited to submit tenders for one or both contracts, and may submit an alternative tender conditional on the Authority accepting their tenders for both contracts.

**TENDER DOCUMENTS**

The Forms of Tender, Conditions of Tendering, General Conditions of Contract, Draft Form of Agreement, Schedules of Rates, Tables of Estimated Quantities and Amounts, Specification and Drawings for both Contracts are combined in a single set of tender documents. Tender documents will be available on May 22, 1961, and may be obtained by prospective tenderers at a cost of $22.50 per set on application to:—

**Australian High Commissioner,**
**Royal Bank Chambers,**
**100 Spark Street**
**OTTAWA,**
**CANADA.**

**Australian Consulate-General,**
**International Building,**
**Rockefeller Center,**
**636 Fifth Avenue,**
**NEW YORK,**
**U.S.A.**

**Australian Consulate-General,**
**153 Kearney Street,**
**SAN FRANCISCO,**
**U.S.A.**

**Liaison Officer,**
**Snowy Mountains Hydro-electric Authority,**
**c/o United States Bureau of Reclamation,**
**Federal Center,**
**DENVER, COLORADO,**
**U.S.A.**

*All relevant information may be obtained from the above offices.*

**SUBMISSION OF TENDERS**

Tenders for the contracts must be submitted in duplicate in accordance with the Conditions of Tendering, enclosed in sealed envelopes appropriately endorsed with the contract numbers and names of the works tendered for, and addressed to:—

**The Business Manager,**
**Snowy Mountains Hydro-electric Authority,**
**Post Office Box 332,**
**COOMA NORTH, N.S.W., Australia.**

The tenders must be lodged in the Tender Box at Head Office of the Authority at Cooma or be sent by prepaid post in time to be delivered in ordinary course of mail by 12.00 noon on Monday, August 21, 1961.

**K. See, Business Manager**

**OFFICIAL PROPOSALS** enable you to get the greatest variety of bids —and so to get the lowest prices consistent with the best work.

Bids: May 4, 1961

## New York State Road Work

NOTICE TO CONTRACTORS

STATE DEPARTMENT OF PUBLIC WORKS, ALBANY, N. Y.—Pursuant to the provisions of Highway Law, sealed proposals will be received until 10:30 a.m., Advanced Eastern Standard Time, on May 4, 1961, by Henry A. Cohen, Director, Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany, N. Y., for:

SOIL EXPLORATIONS AND FOUNDATION INVESTIGATIONS AT VARIOUS SITES ON INTERSTATE ROUTE 570, BEAR STREET TO CLINTON STREET, NEW PROJECT NO. 1-690-3(1)214, OLD PROJECT NO. 1-1139(1), ITEM 57B, CITY OF SYRACUSE, ONONDAGA COUNTY, WHICH CONSTITUTES CONTRACT SPEC. NO. FA-SM-180.

Maps, plans and specifications may be examined and obtained at the following offices:

(a) Bureau of Contracts, 12th Floor, The Governor Alfred E. Smith State Office Building, Albany 1, New York.

(b) Mr. Earle E. Towlson, District Engineer, New York State Department of Public Works, 333 East Washington Street, Syracuse, New York.

(c) Mr. William Mende, Principal Building Construction Engineer, Department of Public Works, 270 Broadway, New York City.

The deposit for a set of plans, specifications and proposal forms is $5.00. Refunds of deposits for plans, specifications and proposals will be made only in case the deposits of individual sets are $10.00 or more, per Chapter 835, Laws of 1960.

The Engineer's Estimate of cost for this work is $32,975.00.

Proposal for this contract must be submitted in separate sealed envelope with the name of the contract plainly endorsed on the outside of the envelope. Proposal must be accompanied by draft or certified check, payable to the order of the "State of New York, Commissioner of Taxation and Finance" for the sum of $1750.00. The retention and disposal of the bidding check, the execution of the contract and bonds shall conform to the provisions of the Highway Law as set forth in "Instruction to Bidders."

The right is reserved to reject any or all bids.

J. BURCH McMORRAN
SUPERINTENDENT OF
PUBLIC WORKS

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Bids: May 16, 1961

## Port of Oswego Authority
## East Side Terminal Facilities, Contract 1
## Reconstruction of Existing Wharf

ADVERTISEMENT FOR BIDS

Sealed proposals will be received by the Port of Oswego Authority in the Common Council Chambers, City Hall, Oswego, New York, until 2:00 p.m., Eastern Daylight Time, on the 16th day of May, 1961, and immediately thereafter will be opened publicly and read aloud.

The work to be done under this contract shall be completed in 90 calendar days after the date specified in the Notice to Proceed, and consists of:

Concrete pile cap, grading and paving, removal of existing railroad track, new railroad track, bollards and anchorages, rubber fender system, steel ladders, pipe conduits and manholes, concrete drainage pipe, drop inlets, and the repair of existing stone-filled timber cribs.

Bid guaranty in the amount of $5,000 and a performance bond in the sum of 100 per cent of the contract price will be required.

Contract Plans, Specifications and Proposal Forms may be obtained from the Port of Oswego Authority, West First Street, Oswego, New York, and from the Engineer, Fay, Spofford & Thorndike, 11 Beacon Street, Boston 8, Massachusetts, on or after the 20th day of April, 1961.

A deposit of $20.00 is required for a complete set of Contract Documents and Plans, which will be refunded upon return of the Plans and Specifications in good condition within 10 days after the opening of bids.

PORT OF OSWEGO AUTHORITY
By Clark Morrison III, Chairman

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OFFICIAL PROPOSALS

Bids: May 11, 1961

## Power Authority of the State of New York
## Niagara Power Project

ADVERTISEMENT FOR PROPOSALS

FOR GRADING, TOPSOILING AND SEEDING, WATERWAYS, WORK SECTION II LOCKPORT ROAD NORTH TO VANADIUM SPOIL AREA IN NIAGARA, NIAGARA COUNTY, NEW YORK
SPECIFICATION NO. PA-N-23044
NIAGARA CONTRACT NO. N 35

NOTICE TO CONTRACTORS: The Power Authority of the State of New York will receive sealed proposals for the grading, topsoiling and seeding of Waterways, Work Section II from Lockport Road North to Vanadium Spoil Area in Niagara, Niagara County, New York, until 10:30 A.M. Eastern Daylight Saving Time on the 11th day of May, 1961, at the Authority's Office, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York 19, New York, at which time and place the proposals will be publicly opened and read aloud.

The principal items of work are: Estimated:

| | |
|---|---|
| 74 acres | Grading |
| 74 acres | Topsoiling, 4 inches thick |
| 74 acres | Fertilizing, Seeding, Mulching and Maintenance |

All work shall be completed on or before December 1, 1961.

Plans, specifications and proposal forms for the work may be obtained from the Power Authority of the State of New York, 18th Floor, The Coliseum Tower, 10 Columbus Circle, New York, 19, New York, upon application and prepayment of a fee of Ten Dollars ($10.00) per initial set of contract documents, and Five Dollars ($5.00) per set for additional sets, no part of which will be refunded. Plans, specifications and proposal forms for the work will be on file in the Authority's Office, and in the offices of the Engineer, Uhl, Hall & Rich, 230 Congress Street, Boston 10, Massachusetts, and may be inspected by prospective bidders during office hours.

Bids must be made and returned in duplicate in accordance with instructions contained in the Information for Bidders. Guarantee will be required with each bid in an amount not less than 20 percent of the total of the gross sum bid.

The right is reserved to reject any or all bids.

W. S. CHAPIN,
GENERAL MANAGER

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Bids: May 16, 1961

## Commonwealth of Puerto Rico
## Department of Public Works

DE DIEGO STORM WATER PUMPING STATION
MUNICIPALITY OF SAN JUAN, P. R.
ADVERTISEMENT
April 21, 1961

The Board of Awards of the Department of Public Works of Puerto Rico will receive sealed proposals for the construction of the De Diego Storm Water Pumping Station, Municipality of San Juan, Puerto Rico.

Bidders shall submit their proposals at the office of the Board of Awards in the Department of Public Works until 2:00 P.M. (Puerto Rico time) on the Sixteenth day of May, 1961 at which time and place said proposals will be publicly opened and read aloud.

The work to be done comprises furnishing all materials and labor, tools, plant and equipment necessary for constructing, installing and completing ready for operation the De Diego Storm Water Pumping Station.

Copies of the plans, specifications and instructions to bidders may be examined without charge at the office of the Procurement and Contracts Division of the Department of Public Works or at the offices of Buck, Seifert & Jost S.A., Consulting Engineers, 223 Manuel V. Domenech Street, Hato Rey, Puerto Rico and 112 East 19th Street, New York 3, New York. Copies thereof may be obtained at the office of the Procurement and Contracts Division of the Department of Public Works until 96 hours prior to the opening of bids or at the office of Buck, Seifert & Jost S.A., Consulting Engineers, 112 East 19th Street, New York 3, New York until one (1) week prior to the opening of bids, upon a deposit of TWENTY ($20.00) DOLLARS in cash, money order or certified check payable to the Secretary of the Treasury. The full amount of the deposit will be refunded

OFFICIAL PROPOSALS

to each depositor upon the return of the plans and specifications in good condition within twenty (20) days after the opening of bids.

Each proposal must be accompanied by a provisional bond in the amount of TWENTY-FIVE THOUSAND ($25,000.00) DOLLARS in any of the forms indicated in the instructions to bidders.

The Board of Awards reserves the right to accept any bid or to reject any or all bids and to award any contract under the conditions found most favorable to the Commonwealth of Puerto Rico.

FRANCISCO LIZARDI
Secretary of Public Works
BUCK, SEIFERT & JOST S.A.
Consulting Engineers

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Bids: See Advertisement

## The Port of New York Authority

Sealed proposals for the following work will be received at the Office of the Chief Engineer, Room 1100, 111 Eighth Avenue, New York 11, N. Y., until 2:30 P.M. on date indicated, at which time said proposals will be opened and read in Room 1108.

Contract PN-630.003—Port Newark—Berths 34, 36 & 65—Paving and Utilities—Deposit $30.00 per set of documents—Bids will be received until 2:30 P.M. on Thursday, May 18, 1961.

Contract LT-110.016—Lincoln Tunnel—Alterations to West 37th Street Bridges—No deposit required—Bids will be received until 2:30 P.M. on Thursday, May 11, 1961.

Contract documents may be seen at the Office of the Assistant Chief Engineer for Design, Room 1115, 111 Eighth Avenue, New York 11, N. Y. Documents will be furnished upon receipt of the above deposit (each set including one copy of the Contract Drawings) for not more than three sets to any one company. Additional sets will be furnished upon payment of an amount for each set equal to the deposit indicated above, which payment is not returnable. Deposits and payments shall be delivered to the Treasury Department, Room 1001, where a receipt will be issued. The receipt shall be delivered to Room 1115, where the documents will be furnished.

Those who have submitted a bid on the contract directly to the Authority will receive a refund of the deposit for each set of documents, not exceeding three, returned within forty days after the opening of proposals. Those who have not submitted a bid will receive a refund of one-half of the deposit for each set of documents, not exceeding three returned within forty days after the opening of proposals.

THE PORT OF NEW YORK AUTHORITY
S. Sloan Colt, Chairman
New York, April 27, 1961

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### U. S. Government

Department of Commerce, Bureau of Public Roads, April 18, 1961. SEALED BIDS will be received at the office of C. E. Kinney, Division Engineer, Bureau of Public Roads, 920 South Jefferson Street, Roanoke, Virginia, until 11:00 a.m., E.S.T., MAY 18, 1961, for Project 2T1, Blue Ridge Parkway, Henderson and Buncombe Counties, North Carolina. Grading, Draining, Two Tunnels with Lining, Crushed Aggregate Base and other work from Beaverdam Gap 3.884 miles to Cutthroat Gap. The approximate quantities of the more important items are: 460,000 cu. yd. Unclassified Excavation for Roadwork, 18,200 cu. yd. Unclassified Excavation for Tunnel, 24,000 tons Crushed Aggregate Base and 770 lin. ft. Concrete Tunnel Lining. Minimum wage rates have been fixed as required by law. Plans, specifications and bid forms are available upon request at the address given above.

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DEPARTMENT OF THE INTERIOR, Bureau of Reclamation. Sealed bids (Specifications No. DC-5575) will be received at Durango, Colorado, until 10 a.m., Mountain Standard Time, June 1, 1961, for furnishing labor and materials for Lemon Dam and County Road Relocation, Florida Project, Colorado. Location near Durango, Colorado, in La Plata County. Principal items are excavation 3,500,000 cu. yds.; embankment 2,900,000 cu. yds.; concrete 15,400 cu. yds.; and other work. Completion time 900 days. For particulars, address Bureau of Reclamation, P. O. Box 640, Durango, Colorado; P. O. Box 360, Salt Lake City, Utah; or Building 53, Denver Federal Center, Denver 25, Colorado. Floyd E. Dominy, Commissioner.

*ADDRESS BOX NO. REPLIES TO: Box No.*
*Classified Adv. Div. of this publication.*
*Send to office nearest you.*
*NEW YORK 36: P. O. Box 12*
*CHICAGO 11: 520 N. Michigan Ave.*
*SAN FRANCISCO 11: 255 California St.*

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## • POSITIONS VACANT

**Soils Engineer. Graduate Civil Engineer** with field experience in foundation investigation, testing, and laboratory management. Will supervise field exploration and soils laboratory testing for highway construction. Required to analyze field information and test data to develop design criteria and recommend construction technique. Salary, to be negotiated depending on experience. Location, Intermountain West. P-6187, Engineering News-Record.

**Structural Engineer-Midwest consulting firm** seeks Ph.D. to design complex steel structures, reinforced and prestressed concrete. Preference will be given to applicants with practical experience. Permanent position with established firm in business since 1929. Moving expenses paid. Send resume, including education, experience, and personal qualifications to P-6245. Engineering News-Record.

**Overseas Position: Water supply, planning** and design engineer. Consultant to advise Peruvian Inter-Ministerial Committee of highly qualified sanitary and hydraulic engineers in the development of a national water supply plan for Peru. Must be well qualified in broad planning aspects of small and medium-sized city water systems with particular emphasis on design and financing, as well as administration of large country plan. Must be able to work on high policy level. Headquarters: Lima, Peru. Salary $10,000 to $14,000 (dependent on qualifications) plus allowances. Write Box ENR-4, Office of Public Health, International Cooperation Administration, Washington 25, D. C.

**Permanent Position: Structural engineer** with at least an M.S. degree from well recognized engineering school. Well grounded in the Theory of Elasticity to handle complex indeterminate structures. Excellent living conditions, good future for young and responsible engineer. Submit Graduate School credits. Location, North Carolina. P-6338, Engineering News-Record.

**Civil Engineer—Young, energetic, to work** on construction jobs. Previous experience not necessary. P-6557, Engineering News-Record.

**Estimator—Quantity takeoff, some pricing.** Work under chief estimator. Some travel. Young engineer preferred. Nationwide contractor, home office Northern Ohio. P-6552, Engineering News-Record.

**Soils Stabilization Engineer, college graduate** with experience in highway soils or soil stabilization. Both field and laboratory experience desirable. Technical service position involving combination of staff and field work on highway chemicals for soil stabilization, dust control and ice control supporting national sales organization. Send resume to P-6549, Engineering News-Record.

**Bridge Engineer and Junior Structural** Engineers — Positions open in Southern Connecticut firm. Send complete resume on experience, references, salary requirements and availability to P-6554, Engineering News-Record.

**Engineers experienced in water and sewage** works projects or related fields. Opportunity for permanent connection with long established consulting firm. Please state full qualifications, experience, references and salary requirements. Location Ohio. P-6198, Engineering News-Record.

**Mechanical Engineer-Experienced in design** and maintenance of industrial heating, air conditioning and steam distribution systems for a large medical research center. Excellent opportunity to grow with organization. Beginning salary $8,955. Federal Civil Service Merit System position with all retirement, leave and insurance benefits. Relocation expenses reimbursed. Write Mr. Ross Holliday, Plant Engineering Branch, National Institutes of Health, Bethesda 14, Maryland.

**Estimator, Office Engineer. Experienced** in commercial & industrial building construction. Permanent position with progressive contractor North Central Conn. State availability & minimum salary requirement. P-6568, Engineering News-Record.

## POSITIONS VACANT

**Traffic Engineer — $9030-$10,860, N. Y.** State. Challenging opportunity for P. E. with one or two years in traffic engineering or highway planning. New York State residence not required. Write Recruitment Unit, Civil Service Dept., Box 86D, State Campus, Albany, New York.

**Graduate civil engineer or geologist with at** least 2 years experience in caisson construction or foundation test drilling capable of project supervision. Contact American Foundation Corporation, 5204 East 25th Street, Indianapolis, Indiana.

**Construction Administrator: progressive firm** engaged in extensive contract housing and home building in Southwest-Midwest. Immediately desire man with experience in estimating, purchasing and project management to head contract housing activities. Excellent future and compensation with growing company. P-6580, Engineering News-Record.

**Bridge Superintendent and Project Engineer.** Midwest bridge and highway construction company needs Civil Engineer for project supervisor. Must be twenty-five to forty years old and willing to move with work within single state area. Send full resume to P-6582, Engineering News-Record.

**Resident Engineer wanted for $6,000,000.00** job; ready about July 1st, 1961. Give educational background, experience, references, and salary expected. P-6587, Engineering News-Record.

**Soils Engineer-C.E. graduate for responsible** position with engineering firm. Prefer young man with some experience or Master's Degree. Location Washington, D. C. Resume to P-6581, Engineering News-Record.

**Highway Engineer for moderate size con**sultant in Midwest university city, to work on diversified civil engineering projects. P-6597, Engineering News-Record.

**Senior Civil Engineer (Physical Research).** Salary $9030 to $10,860. Open to New York State residents. Requires N.Y.S.P.E. license and two years of civil engineering experience including one year of research experience. For details write Recruitment Unit, Box 86C, New York State Department of Civil Service, The State Campus, Albany 1, New York.

## • EMPLOYMENT SERVICE

**200-1,000 new positions reported monthly.** Get free copy. National Employment Reports, 20 E. Jackson, 902-B, Chicago 4.

## • POSITIONS WANTED

**Chief Estimator—Civil Engineer, age 37.** Field experience from layout engineer to superintendent. PW-6495, Engineering News-Record.

**Chief Estimator, Building Construction.** Extensive competitive experience on all types, can take full charge of bid, take-off to completion. Successful record. Resume and highest references upon request. PW-6494, Engineering News-Record.

**Construction Co. Executive, BSCE, MBA,** PE, 13 years experience as Field Engineer, Superintendent, Estimator-Project Manager, Gen'l Superintendent, Partner and Vice President. Age 38. Present salary $18,000. Capable of complete firm management. PW-6486, Engineering News-Record.

**Chief Estimator—25 years experience all** phases Building and Heavy Construction—qualified to handle job from bidding to completion—available immediately—will relocate to suit. PW-6550, Engineering News-Record.

## POSITIONS WANTED

**General Superintendent — Proj Mgr, Hvy** Const, roads, bldgs, flood control, tunnels, excellent mech. background, P. O. Box 48, St. Louis 5, Mo.

**Civil—Structural, BCE, 38, Registered 8** states, 13 years industrial planning and design experience. Presently self employed. Desire permanent position with responsibility and future. Will invest. Will relocate. PW-6558, Engineering News-Record.

**B.S.C.E. 30, 2 yrs experience building** construction & estimating. 1½ yrs experience in design and plant engineering. Structures, piping and heavy machinery installation in a nuclear reactor facility. AEC "Q" clearance. N.E. area preferred. PW-6528, Engineering News-Record.

**Chief Estimator-Engineer 20 years experience** in engineering-construction field. Ten years in estimating, the last six as chief Estimator. Experience primarily in building and heavy construction. Desire greater challenge. PW-6440, Engineering News-Record.

**Project Manager—Construction Supt. Avail**able immediately. 25 yrs experience all types construction. Complete job management. PW-6564, Engineering News-Record.

**Engineer:-B.S., M.S., RLS (Md. & Va.). 20** yrs. exp. highways, estimates, soils. Seeks job as Field or Layout Engr. or Party Chief. Will accept temporary job. Age 60. $150 per week. PW-6413, Engineering News-Record.

**Construction Superintendent: highways,** dams, heavy excavation, grading. Complete job responsibility. PW-6595, Engineering News-Record.

**Supt. Heavy Construction, 30 years experi**ence, large R.f. concrete structures, bridges, coffer dams, earth, rock excavation, concrete pavement. Have know how, get results. C. Barth, 706 S. Calumet, Marion, Illinois. Phone WY 3-8327.

**Equipment maintenance superintendent or** equipment superintendent of heavy construction, capable of setting up repair, preventative maintenance, cost, etc. program. 16 yrs. exp. 35 yrs old. U.S. or foreign. Available in May. PW-6586, Engineering News-Record.

**Construction Manager, BSCE, PE, seventeen** years broad experience construction projects from bid to completion. Available on reasonable notice. PW-6600, Engineering News-Record.

**BCE, age 29, 5 yrs experience. Desires po**sition in contract handling or marketing. Available now. Will relocate. Resume on request. PW-6599, Engineering News-Record.

**Senior Civil Structural Engineer, Regist.** Broad experience in large bridges; indust., comm., instit. bldgs, etc. Handles multi-million dollar jobs from A to Z. Avail. for partnership or respon. position. PW-6591, Engineering News-Record.

**Prestressed and reinforced concrete design** and field engineer, 37, German civil engineering diploma, 5 languages, 12 years experience Germany and Africa. Will relocate at my expense anywhere U.S.A., prefer East or South-East. Reply G.K.A.K., P.O. Box 3828, Johannesburg, South Africa.

**Wanted. Reinforcing Steel Detailer wants** farmed out work. Five years experience. Complete information as to education, experience, references given upon request. Write care PW-6598, Engineering News-Record.

# MECHANICAL ENGINEERS

Challenging overseas position, with an excellent opportunity for professional development, immediately available. Require the services of a graduate Mechanical Engineer on the supervision of construction of the Powerhouse on a hydro-electric project in Thailand. Prefer engineer with five or more years of experience on hydro-electric dams and power-house experience. Position duties will include the installation of the penstocks, radial gates, fixed wheel gates, hydraulic turbines, governors and the mechanical features of the switchgear. 24 Month Contract, living quarters furnished, excellent salaries, opportunity to visit foreign countries.

*Write fully include salary data*

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For detailing Reinforcing Steel, Steel Joists, and similar products. Only those experienced in this or allied fields will be considered. Permanent position, air-conditioned office, 40 hour week, retirement plan, paid vacations, hospitalization and Group insurance plans. Location Richmond, Virginia.

*Reply giving brief resume of experience, education and salary expected.*

P-6540, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

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**LOCATION—Eastern New York State**

Long Established Business. Distributorship Heavy Construction Machinery.
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Preference experience in design and Estimating and selling aggregate, and Asphalt and Concrete Plants.
Eligible candidates reply immediately.
All information furnished to be held in strict confidence.

P-6538, Engineering News-Record
Class. Adv. Div., P. O. Box 12, N. Y. 36, N. Y.

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Civil or Hydraulic Engineers with or without design experience in hydraulics, concrete or soil mechanics, for work on the design of hydraulic structures in Pennsylvania. Salary to $9000. State experience, salary requirements and references.

**Commonwealth of Penna.**
**Dep't. of Forests and Waters**
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*and*
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*Also, Openings For*

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Forward resume of education & experience together with present salary requirements and availability date to:

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**GIRDLER CORPORATION**
**P.O. Box 174, Louisville 1, Kentucky**

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BECHTEL

# HYDRO

**Engineers**

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Immediate openings for engineers with design of hydro electric projects, both preliminary and final phases.

Liberal relocation allowances for you and your family. Send resume to: Personnel Manager.

**BECHTEL CORPORATION**
**220 Montgomery Street**
**San Francisco, Calif.**

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# SENIOR CONTRACTS ESTIMATOR

A large steel plate fabricator in the Chicago area requires an engineer to be responsible for the development of standards and procedures which permit the company to bid as a general contractor where our products are a dominant portion of the job. He will be responsible for developing costs of foundations, earth work, painting, auxiliary electrical, etc. In addition, this position includes participation in bids prepared as joint ventures. This position will carry supervisory responsibilities by projects. A candidate should have a technical degree from a fully accredited university — preferably Civil Engineering with a major in structures, soil mechanics or concrete. He should have at least 5 years of estimating experience on general construction projects. In the absence of full academic compliance, specific experience may be substituted. This position carries a nine to twelve thousand dollar starting salary. Please reply sending complete resume to

P-6543, Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

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# ENGINEER

Chief Engineer, P.E. Knowledge structural steel. Large New Jersey fabrication and erection organization has permanent position available for an engineer with executive ability. Must be thoroughly experienced in design, detailing, fabrication and erection practices. Unusual opportunity for well qualified aggressive individual. Replies should be complete and will be treated in full confidence.

P-6576, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

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**SENIOR CONTRACTING ENGINEER**
**CHICAGO LOCATION**

Responsible for accurate and effective handling of contract documents beginning at the inquiry stage, through estimating, proposal preparation and coordination with Sales Department during final presentation. This involves direct customer contact and close liaison with all departments. Must have university degree in Civil or M.E.

P-6544—Engineering News-Record
520 N. Michigan Ave., Chicago 11, Ill.

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**STRUCTURAL ENGINEER**

Structural Steel Fabricator seeks men desiring permanent position in structural steel and steel plate estimating and designing. Desires men with minimum of five years experience in this type of work. Send resume including education, experience and personal qualification to

P-6532, Engineering News-Record
Class. Adv. Div., P.O. Box 12, N. Y. 36, N. Y.

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2500 Ft.—30" conveyor complete w/drives and belt
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2500—L.F. 30" Naylor spiral vent pipe 20' and 30' lengths
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6—Joy series 100 single and two stage axi vane fans
PRAIRIE CONSTRUCTORS
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3700 PCS. BETH. SP6A, 50', 56' & 48' & 40' & 35'
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2800 PCS. BETH.—AP3, 10', 25', 30', 35' & 60'
2500 PCS. BETH.—DP2—31', 35', 40', 50', 60'
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## Mandate for Highways

MICHIGAN'S RE-ELECTION of John C. Mackie as state highway commissioner (ENR Apr. 13, p. 21) represents an overwhelming vote of confidence in its accelerated highway program. Such an interpretation of his victory seems justified because his election was, in effect, a giant public opinion poll in which a million voters expressed approbation or disapproval of modern highway building. And since Michigan is the only state to elect the operating head of its highway department, the election provided a unique test.

The sole issue in the campaign was the highway program. Mr. Mackie campaigned on the theme that good roads mean more profits for business, more safety for the motorist and a better state for everyone. He offered the highway construction program of the last four years as the reason he should be elected.

His opponent attacked the method of financing, and the design of the new highways, as well as the validity of announcing highway plans five years in advance.

Commissioner Mackie won by a majority of a quarter-million votes, a near landslide. Michigan voters endorsed the program and, in effect, called for building more and better highways now.

Members of Congress who are responsible for solving the current financing crisis should take note of Michigan's clear-cut directive for a continuation of highway development at utmost speed.

## Right Man for IJC?

TINO RONCALIO, a Wyoming banker and political leader, has been named U.S. chairman of the International Joint Commission, which concerns itself with border waters shared by the U.S. and Canada. He fills the vacancy that has existed since the death of Douglas McKay in July, 1959.

The U.S. chairman will lead a U.S. triumvirate in which Eugene Webber, civilian employee of the Corps of Engineers, and Francis Adams of the Federal Power Commission staff, can claim much experience in IJC affairs. In fact, with Mr. Webber as acting chairman, these two capably hammered out, with the three Canadian members, the basis for final accord on the Columbia River that now needs only Parliamentary ratification in Canada to make it an international treaty.

Mr. Roncalio's Canadian counterpart is the able and forceful engineer-administrator, A. G. L. McNaughton. It had been our expressed hope (ENR Nov. 12, 1959, p. 116) that someone to match General McNaughton in prestige and ability, someone with proved competence in the water resource field, might be named U.S. chairman.

Mr. Roncalio's background is quite different from what we had thought most desirable. Nevertheless, we hope that he proves to be the right man for the job. A White House spokesman tells ENR he was chosen for his ability in administration and negotiation. Obviously these are talents that an IJC chairman will need. We hope that Mr. Roncalio will exercise them effectively in the days ahead.

## Surveying Is Engineering

USEFUL WORK is being done by the American Society of Civil Engineers in developing recognition of surveying as part and parcel of civil engineering rather than as a separate technique. And quite properly this recognition is being sought—and justified—on the grounds that many of those who practice in the field of surveying do so on a satisfactory level of professional competence—and that those who do not can and should be encouraged to upgrade their abilities. The path to such recognition is clearly through the state registration laws for professional engineers and land surveyors. The results will hinge on how these laws are worded and applied.

In 1959 ASCE came out with a policy declaration "that state engineer examination boards should give appropriate recognition to professional-level experience in surveying and mapping." The declaration was also accompanied by a classification chart of surveying positions that, for the first time, offered a definite guide to distinguish professional, sub-professional and non-professional work.

Some progress in implementing this policy was reported by the Society's Committee on Registration of Engineers at the Phoenix convention two weeks ago—the inclusion of surveying in the definition of engineering in the California registration law, and the use of the word "surveys" in the definition given in the revised Model Law of the National Council of State Boards of Engineering Examiners. (The committee, incidentally recommends that the word be changed to "surveying.")

This is progress because, once surveying is a part of the definition of engineering, registration boards will have authority to recognize professional-level surveying experience as part of the qualification for engineer registration, to include surveying subjects in engineering examinations, and even to discipline a registered engineer for incompetent surveying practice. Subsequently, this may well lend encouragement to persons holding only land surveyor licenses to increase their competence to a point where they can qualify for registration as professional engineers. And it would place all land surveyors under pressure to do a better job.

Surveying, and the maps and layouts that result, are basic to the accuracy of all engineering. Nothing less than the best professional standards and competence should be allowed to govern such work. The efforts of the ASCE to assure such standards and competence, therefore, deserve widespread support.

# "Here's how we solved the problem of placing concrete around closely spaced steel reinforcing"

*Report on new $7 million Charlotte hospital project*

**WILLIAM E. LITTLE,** President
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"Closely spaced reinforcing steel in the columns and 14 lb. of steel per sq. ft. of floor slab on this project made it one of the roughest concrete placing jobs we've had. This problem was related to the architectural and engineering need for 'tying in' the existing hospital structure with this 11-story addition.

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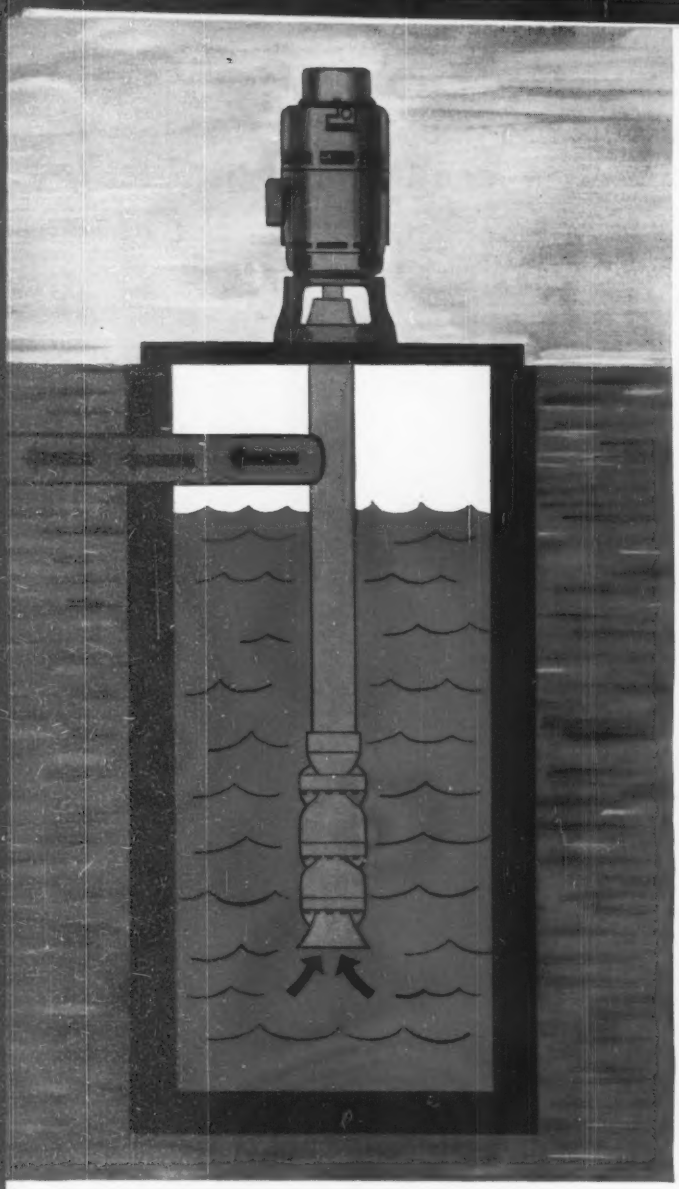

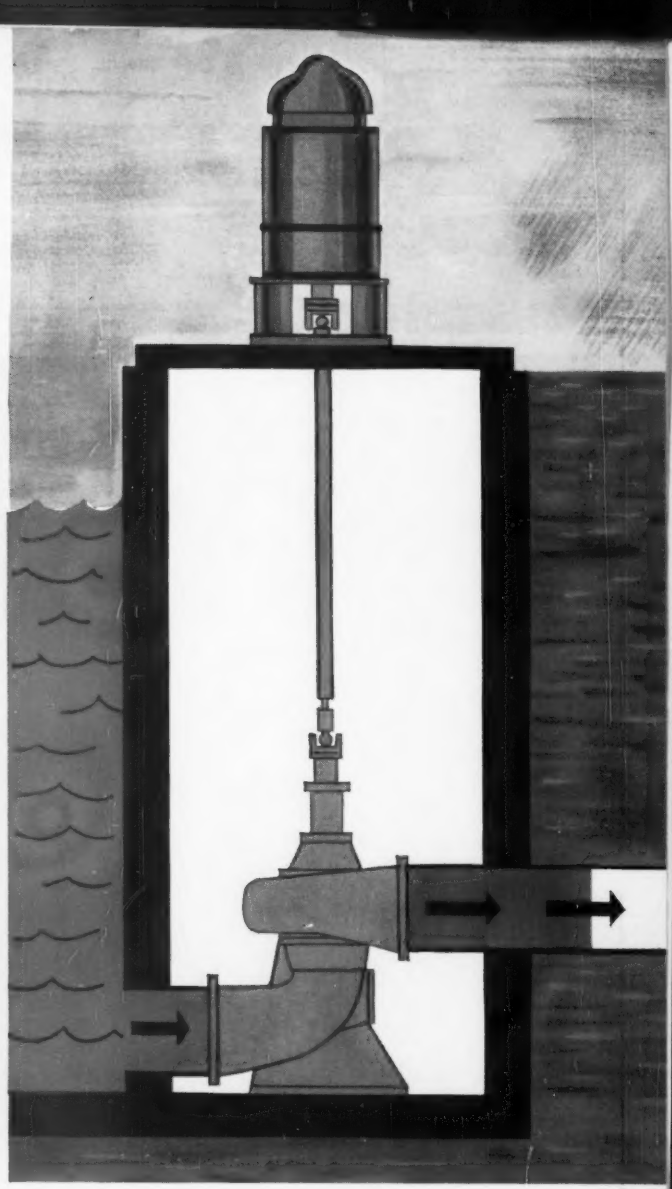

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